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# ALBERTA

# ENERGY RESOURCES CONSERVATION BOARD

# DECISIONS

1986

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DECISIONS 1986

| NO. | APPL. NO. | DATE | |
|---|---|---|---|
| D 86-1 | 850758 | Jan. 30/86 | Application by Societe Quebecoise D'Initiative Petrolieres - To Amend Gas Removal Permit |
| Memo of Decision | 850046 | Feb. 27/86 | Dome Petroleum Limited - Review and Rescind Board Order No. Misc. 7806, North Coleman Gas Block No. 1, Coleman Field |
| D 86-2 Bound Report | 851037 | June 1986 | A Report on an Application by Shell Canada Ltd to Drill A Critical Sour Well in the Jutland (Castle River South) Area |
| D 86-3 2 Parts | 850583 | May 23/86 | Application by Hewitt Oil (Alta.) Ltd. - For Approval of a Gas Processing Plant, Golden Spike Area. - Executive Summary, Application by Hewitt Oil (Alta,) Ltd. |
| D 86-4 | 850819 | Apr. 21/86 | Atlas Yellowknife Resources Ltd. - Pigeon Lake Gas Processing Plant and Oil Battery |
| D 86-5 | 860109<br>860110<br>860111 | Apr. 18/86 | Alberta Energy Company Ltd. - Application to Construct Water Effluent, Ammonia and Nitrogen Pipelines |
| D 86-6 | 851395 | July 16/86 | Esso Resources Canada Ltd. - Cold Lake Production Project Phases 7 to 10 |
| D 86-7 | 860172 | May 20/86 | Application for Gas Removal Permit- Shell Canada Limited |
| D 86-8 | 860346 | May 15/86 | Diamond Shamrock Exploration of Canada Ltd. Application for a Well Licence, Pembina Field |
| D 86-9 | 860467 | July 10/86 | Transalta Utilities Corporation - Cascade Hydro Development Modifications |
| D 86-10 | 860168 | Aug.14/86 | PanCanadian Petroleum Limited - Commercial Oil Sands Project, Lindbergh and Frog Lake Sectors |
| Memo of Decision | 860159 | Aug. 25/86 | Chevron Canada Resources Limited - Gas Processing - Kaybob South and Various Fields Pre-Hearing Meeting, 14 August 1986 |
| D 86-11 | 860590<br>860647 | Oct. 14/86 | Norcen Energy Resources Limited - Solution Gas Processing Plant and Central Oil Battery Spirit River Field |
| D 86-12 | 860692 | | High Level Energy Limited |

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# DECISIONS 1986

| NO. | Appl. No. | Date | |
|---|---|---|---|
| D 86-13 | 860749 | Aug. 28/86 | Gulf Canada Corporation - Application For a Well Licence, St. Albert - Big Lake Field |
| D 86-14 | 860072 | Aug 21/86 | Gulf Canada Corporation - Compulsory Pooling Chedderville Area |
| D 86-15 | 860281 | Oct. 7/86 | Town of Okotoks - Pursuant to Section 34 of The Pipeline Act (request thatthe Board direc Canterra Energy to locate an ESD Valve on existing pipeline.) |
| D 86-16 | 860159 | Sept. 3/86 | Chevron Canada Resources Limited - Increased Ethane Recovery Kaybob South Gas Processing Plant |
| D 86-17 | 860850 | Sept. 24/86 | Northwestern Utilities Limited - Application for A Well Licence Hercules Field |
| D 86-18 | 860664 | Oct. 28/86 | Fording Coal Limited - Application for Approval of Cassils Railway Siding for Shipment of Bulk Coal Samples |
| (ERCB Report 86-B) | Proceeding No. 860447 | Oct. 2/86 | (Report to the Minister of Energy on the Review of Certain Gas Removal Permits Issued January 3, 1986) |
| D 86-19 | 860997 | Dec. 9/86 | Application for Gas Removal Permit - PSR Gas Ventures Inc. |
| D 86-20 | 860988 | Dec. 15/86 | Westburne Petroleum & Minerals Ltd. - Compulsor Pooling, Long Coulee Field |

**ENERGY RESOURCES CONSERVATION BOARD**

Calgary Alberta

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# APPLICATION BY SOCIÉTÉ QUÉBÉCOISE D'INITIATIVES PÉTROLIÈRES TO AMEND GAS REMOVAL PERMIT

**Decision D 86-1**
**GR 86-1**
**Application 850758**

## 1 APPLICATION

Société québécoise d'initiatives pétrolières (SOQUIP) applied to the Energy Resources Conservation Board (the Board), pursuant to section 10 of the Gas Resources Preservation Act (the Act), for an amendment to Gas Removal Permit SQ 83-1, as amended. The amendment would

(a) authorize volumes of gas that may be removed from Alberta as follows:

  - the total volume during the term of the permit would be increased by 1 372 400 000 to a new total of 7 480 400 000 cubic metres,
  - the annual volume would be increased by 104 025 000 to a new annual volume of 512 100 000 cubic metres, and
  - the maximum daily volume would be increased by 285 000 to a new maximum daily volume of 1 403 000 cubic metres during the period 1 November 1985 to 31 October 1997, and the maximum daily volume would be increased by 170 000 to a new maximum daily volume of 1 103 000 cubic metres during the period 1 November 1997 to 31 October 1999.

(b) provide for the removal of gas not removed during a particular annual period during any of the next four annual periods, all periods within the term of the permit and all removals subject to maximum daily limitations,

(c) provide for delivery of up to 110 per cent of the specified maximum daily volumes when necessary, to avoid temporary operating problems,

(d) add the Bonnie Glen, Ferrybank, Gilby, and Westerose fields, pools, and areas to the list from which gas may be obtained for removal from the province, and

(e) authorize a permit term of 14 years, ending 31 October 1999, which represents no change from the existing permit.

SOQUIP, a corporation owned by the Province of Quebec, is currently removing gas from Alberta under Gas Removal Permit SQ 83-1. The permit authorizes removal of 6 108 000 000 cubic metres of gas during the period 27 July 1983 to 31 October 1999. The additional gas volumes requested would be used to satisfy increased demand on the system of Gaz Inter-Cité Québec Inc. (GICQ) in the Drummondville, Quebec, area, and to satisfy forecasted additional requirements of Gaz Métropolitain inc. (GMi) in the Montreal, Quebec area. The gas would be transported to the Alberta-Saskatchewan border by NOVA, AN ALBERTA CORPORATION and by TransCanada PipeLines Limited to the Province of Quebec.

## 2 HEARING

On 14 November 1985 the Board convened a hearing of the application by SOQUIP. At the hearing, the Board heard a motion from the Independent Petroleum Association of Canada (IPAC) for adjournment of the proceedings pending clarification of general policy matters respecting the removal of gas from Alberta and the recently concluded agreement on natural gas markets and pricing. The hearing was adjourned for an indefinite period. On 2 December 1985 the Board received a letter dealing with policy from the Minister of Energy and Natural Resources and that letter was released on 4 December 1985 with an ERCB Informational Letter. (The Minister's letter and ERCB Informational Letter IL 85-17 are attached in Appendix A.)

Subsequent to the issuing of those documents, the Board received letters from IPAC and Brenda Mines Ltd. (Brenda) expressing continued concerns regarding the SOQUIP application. The Board decided to reopen the proceedings to hear the interventions of IPAC and Brenda, and a Notice of Reconvening, dated 23 December 1985, was sent to all participants registered in the earlier SOQUIP proceeding.

The hearing was reconvened in Calgary on 7 January 1986, with G. J. DeSorcy, P.Eng., C. J. Goodman, P.Eng., and G. A. Warne, P.Eng., sitting. Of six interveners filing with the Board only IPAC and Brenda presented evidence.

## THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives<br>(Abbreviations used in report) | Witnesses |
|---|---|
| Société québécoise d'initiatives pétrolières (SOQUIP)<br>B. J. Todesco | R. Pouliot<br>H. Heinrichs, P.Eng.<br>J. Guerin |
| Alberta and Southern Gas Co. Ltd. (A&S)<br>E. O. McAvity | |
| Brenda Mines Ltd. (Brenda)<br>H. M. Kay | J. Balaban, P.Eng. |
| Independent Petroleum Association of Canada (IPAC)<br>A. S. Hollingworth | R. E. Elenko, P.Eng.<br>R. B. Hillary<br>R. G. DeWolf, P.Eng. |
| TransCanada PipeLines Limited (TCPL)<br>E.W.H. Mallabone | |
| Energy Resources Conservation Board staff<br>M. J. Bruni<br>K. Johnston<br>M. E. Mumby<br>G. J. Schroter | |

## 3 ISSUES

The Board is satisfied that the requested removal volumes are very small relative to the established reserves and the trends in growth and discovery of gas in Alberta, and there is no justification to refuse the application because of the present and future needs of Albertans. The Board is also satisfied that the proposed removal would have positive economic impacts on Alberta and that it would be in the public interest. The issues to be considered are those raised by the interveners in connection with the application, namely:

- whether distributor contract carriage arrangements are available in the region in which the gas would be marketed,
- whether there would be a fair and equitable sharing of transportation costs between the gas in question and other gas being removed from the province, and
- whether the non-arm's length purchase of gas by distributors will have a negative impact on the Alberta producing industry and thus be contrary to the public interest.

## 4 CONTRACT CARRIAGE

The matter of contract carriage was addressed in the 2 December 1985 letter from the Minister to the Energy Resources Conservation Board (ERCB). The letter stated that the agreement allows for direct purchase of gas by consumers from producers, provided distributor contract carriage arrangements are available. It also stated that "... it will be government policy to condition any Order in Council or Ministerial Approval authorizing removal of gas from the province so that removal will not be allowed to commence until contract carriage arrangements are available in the particular market region". Given this policy, the Board stated in its IL 85-17 informational letter that it will seek information from applicants respecting the availability of contract carriage but will simply pass the information on to the government and not consider it in the ERCB decision. Accordingly, the following is a summary of evidence presented by the applicant and interveners respecting contract carriage.

### 4.1 Views of SOQUIP

As part of its application, SOQUIP provided a submission made by GMi to the Régie de l'Eléctricite et du Gaz du Québec (the Regie) proposing a formula for contract carriage tolls on its distribution system. SOQUIP stated that it has always supported the idea that more flexibility should be built into the gas distribution system, but that it is necessary also to recognize some of the concerns which Quebec distributors may have as the flexibility objective is achieved. These concerns include the questions of whether or not a transportation toll should have regard for the location of various end-users, and should the toll essentially transfer to end-users the full cost of linking individual plants to the system? SOQUIP stated that although new industrial projects in Quebec would be interested in the direct sale concept, it is difficult to advance a toll system which would ensure that other customers do not bear an unfair financial burden as a result of the system.

The summary position of SOQUIP was that the Regie would decide the issue of contract carriage, the GMi proposal being one of the options before the Regie, and customers will eventually benefit from all the advantages that will result from customer-producer negotiations and contractual arrangements.

### 4.2 Views of Interveners

IPAC questioned the mechanics of the GMi proposal to the Regie, and suggested that the proposal amounts to a buy-sell arrangement rather than pure contract carriage. In IPAC's view the inclusion of eligible firm rate classes in the proposed formula could make the cost of contract carriage prohibitively expensive, in which case end-users would have no alternative but to purchase their gas requirements from GMi. IPAC expressed concern that SOQUIP could be afforded an undue advantage in arranging transportation of its gas in the Province of Quebec, owing to its affiliation with distribution companies in that province.

Brenda stated that its main concern was the monopoly position of local utilities in the Province of Quebec, and specifically that of GMi. As evidence of its concern, Brenda stated that it has been attempting to arrange contract carriage for a gas supply to its parent company, Noranda Inc., at Noranda, Quebec since mid 1984, without success.

Regarding the contract carriage option proposed by GMi to the Regie, Brenda stated that it believed the proposal would result in contract carriage rates being available only to large customers, contract carriage would not really exist in Quebec because the proposal was basically for buy-sell arrangements, displacement of GMi system gas should not be subject to GMi's arbitrary decision, access and priority on the GMi system would be discriminatory and should be determined by the Regie rather than GMi, and the proposal would result in increased marginal contract carriage costs as the cost of gas to GMi decreases. Respecting the latter concern, Brenda stated that flat rates relevant to the cost of gas should be applied to all customers without variance.

It was the position of Brenda that although the SOQUIP application should not necessarily be denied by the Board, the issue of contract carriage in the Province of Quebec should be resolved before gas is allowed to move under the application.

## 5 FAIR AND EQUITABLE SHARING OF TRANSPORTATION COSTS

### 5.1 Views of Participants

Through cross-examination IPAC verified that much of the applied-for volume of gas would be transported through the Trans Quebec and Maritimes pipeline system (TQM). IPAC submitted that the tolls are such that the requested gas would not pay its fair share of transportation costs. The large group of producers under contract to TCPL and Pan-Alberta Gas Ltd. would thus continue paying for almost all the TQM system, and as a result, their netbacks would be depressed. IPAC stated that this inequality results in benefits being conferred on one group of producers at the expense of another group. It confirmed that the effects of such arrangements would be neutral with respect to overall netbacks to Alberta producers, but that the basic inequity was a matter that should be considered by the Board in assessing Alberta's long-term public interest.

SOQUIP expressed the view that while TQM tolling issues have been the topic of considerable debate, the proper forum for their resolution is the National Energy Board rather than the Energy Resources Conservation Board. SOQUIP concluded that these matters were not within the ERCB's jurisdiction and, therefore, should not comprise a part of the Board's assessment of public interest.

### 5.2 Views of the Board

The question of tolls for the TQM system is clearly beyond the jurisdiction of this Board and it makes no comment on them. The only manner in which the issue could be relevant to this Board's consideration of the SOQUIP application is if it was shown that there would be negative impacts of the toll system on the Province of Alberta which would counter-balance any positive impacts of the proposed removal, thus making granting of the application contrary to the public interest.

IPAC alleged that this might be the case but did not present any detailed evidence demonstrating that it would be. Accordingly, the Board would not refuse the subject application because of the possible negative impacts of the TQM system tolls.

## 6 NON-ARM'S LENGTH PURCHASE BY DISTRIBUTORS

### 6.1 Views of Participants

It was IPAC's general contention that monopoly positions enjoyed by provincial gas distribution companies can confer an unfair advantage when, at the same time, distribution companies have corporate links with producing companies. The nature of any unfair advantage would be the result of the inclination of vertically integrated distributors to offer more favourable contracting positions to affiliated producing companies than would be offered to non-affiliates.

With respect to Alberta's public interest, IPAC conceded that pricing and royalty matters were not at issue. Rather, IPAC perceived the issue to relate more to volumes of gas and to be one of freedom of access to market opportunities. In IPAC's view, such freedom of access can be thwarted if gas purchase contracts depend more on corporate affiliation than on arm's-length negotiations. Specifically, IPAC noted that approximately 76 per cent of the gas in the subject application would be supplied from reserves owned by SOQUIP Alberta. IPAC was concerned that, should such marketing arrangements become typical, there could be a long-term erosion of markets for independent producers and this would have a negative impact on the overall health of the Alberta producing industry.

IPAC enjoined the Board to develop guidelines that would, in effect, pro-rate gas supplied under such non-arm's length transactions to their historical level in a given franchise area.

Brenda expressed similar concerns insofar as a concentration of buying power in the hands of distributors would be detrimental to gas producers and the province as a whole. While Brenda did not advocate the establishment of guidelines, it did request that the Board be vigilant to ensure that there is a competitive market.

Neither IPAC nor Brenda expressed concerns about non-arm's length contracts between large industrial users and producers, both stating that these types of arrangements could not tie up a significant share of the market.

In response to the concerns respecting non-arm's length purchases, SOQUIP referred the Board to the "Agreement Among the Governments of Canada, Alberta, British Columbia, and Saskatchewan on Natural Gas Markets and Prices". Section 24 of the Agreement provides for provincial administration of appropriate royalty assessments when non-arm's length sales occur. SOQUIP suggested that this should be the extent of provincial interest in the matter. In commenting on IPAC's suggestion that guidelines be developed, SOQUIP was not in favour of such an approach, and specifically questioned whether the subject application involved a "non-arm's length transaction" as defined by IPAC.

## 6.2 Views of the Board

The Board is unaware of any government policy which would define non-arm's length transactions between a distributor and affiliated producing companies as being contrary to the Alberta public interest. Indeed, it notes that the 31 October Natural Gas Markets and Prices Agreement appears to anticipate the on-going existence of such arrangements. For this reason the Board, in considering the SOQUIP application, is prepared to assess the issue of non-arm's length transactions only from the viewpoint of whether there would be a negative impact on the province which would make the granting of the application contrary to the public interest.

IPAC's concerns emphasized the cumulative effects that such transactions could have, and the primary thrust of its intervention was to seek guidelines that would limit these arrangements over time. The Board will comment on this aspect of the IPAC intervention.

With respect to the specific application before the Board, neither IPAC nor Brenda presented any detailed evidence identifying the negative impacts on Alberta of the non-arm's length aspect of the SOQUIP proposal. The Board postulates that potential negative impacts of such transactions might involve

(a) lower netbacks and royalties to the province if the selling price was artificially less than would result from free negotiations,

(b) drainage problems if, within a pool, only those producers affiliated with a distributor were given a contract, and

(c) exclusion of non-affiliated producing companies from certain market areas and a resulting impact on the overall producing and drilling industry within Alberta.

No evidence was put forward at the hearing that even attempted to relate these or other potential impacts to the subject application or to quantify them. Given the very small volume of gas being requested, less than 1.4 billion cubic metres, the Board does not believe there could be significant negative impacts even if no other remedy existed for dealing with the postulated problems. For this reason, it concludes that the issue of non-arm's length transactions would not detract from the Alberta public interest sufficiently to justify refusal of the SOQUIP application.

The Board has also addressed the potential impact of non-arm's length transactions over time and the IPAC request that the Board develop internal guidelines to limit the extent to which such transactions would be allowed. The Board would not proceed to develop such guidelines, or even rule on their need, without providing other potentially affected parties with an opportunity to speak to the matter. Insofar as the subject hearing is concerned, the Board received no specific evidence either identifying or attempting to quantify potential negative impacts. Rather, it heard broad statements suggesting that "... they will have very adverse consequences over time to the entire producing industry, resulting from the effective exclusion of arm's length purchasers from market areas served by such distributors". It must also be noted that legislation is in place to deal with certain of the potential problems, for example, royalties and drainage as referred to in (a) and (b) in an earlier paragraph. With respect to item (c) in that paragraph, the Board notes that neither of the interveners suggested that there would be a reduction in the total sales of Alberta gas, but only that the distribution of sales among producers would be different.

For all of these reasons, the Board is not prepared at this time to call a hearing or inquiry to consider further the matter of non-arm's length transactions between distributors and affiliated producers. It therefore follows that the Board is not prepared to defer the SOQUIP application, as suggested by IPAC, while such guidelines are being developed. If in the future the Board receives representations which deal in greater detail with the potential impacts of such transactions on the Alberta public interest, it would be prepared to reconsider a hearing to deal with the issue.

## 7 DECISION

Having regard for the evidence presented at the hearing and its responsibilities under the Gas Resources Preservation Act, the Board finds that the granting of the SOQUIP application would be in the public interest. It is therefore prepared, with the necessary authorization of the Lieutenant Governor in Council, to issue an amendment to Gas Removal Permit SQ 83-1. The amendment would be in the form shown in Appendix B and would be subject to the terms and conditions contained therein, as well as any conditions imposed by the Lieutenant Governor in Council.

DATED at Calgary, Alberta on 30 January 1986.

ENERGY RESOURCES CONSERVATION BOARD

GJ DeSorcy

G. J. DeSorcy, P.Eng.
Vice Chairman

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

G. A. Warne

G. A. Warne, P.Eng.
Acting Board Member

ERCB

**Energy Resources Conservation Board**

640 Fifth Avenue SW
Calgary, Alberta
Canada T2P 3G4

# Informational Letter

IL 85-17

Interim

4 December 1985

To: All Operators, Purchasers of Gas, Transmission Companies, Utility Companies, IDP List

## METHOD OF PROCESSING AND REQUIREMENTS OF THE ERCB FOR INFORMATION IN SUPPORT OF APPLICATIONS FOR REMOVAL OF SMALL VOLUMES OF GAS FROM ALBERTA

*This informational letter replaces Informational Letter IL 85-5 Interim which was issued on 3 June 1985.*

Interim IL 85-5 sets out a revised policy for handling applications to remove small volumes of gas from the province. The new policy reflects changes that are necessitated by the Agreement of 31 October 1985 between the federal government and the gas producing provinces respecting Natural Gas Marketing and Pricing, and a letter to the ERCB from the Minister of Energy and Natural Resources clarifying the Alberta government position respecting gas removal matters. A copy of the Minister's letter is attached.

As a result of the Minister's letter and his indication that the Gas Resources Preservation Act will be amended at the first opportunity, the ERCB is immediately dispensing with the incrementality test in assessing the public interest of removal applications. The ERCB will accept that pricing arrangements for proposed removals are in the Alberta public interest if they are generally in accordance with the provisions of the Agreement.

Also as a result of the Minister's letter, the ERCB will be seeking information from applicants respecting the availability of contract carriage in the intended market place, but will simply pass that information to the government. It will not be considered by the ERCB in its decision regarding applications.

The attached letter from the Minister also requests that the ERCB review its procedures and formulae currently used in the administration of sections 5(3)(a) and (b) of the Gas Resources Preservation Act. (These sections relate to the determination of gas reserves surplus to Alberta's needs.) The ERCB intends to call a hearing for that purpose, likely to take place in the first quarter of 1986.

This informational letter relates to applications to remove volumes of less than 3 billion cubic metres of gas and will be used on an interim basis during the coming months. A revised informational letter will be issued after some experience is gained under the new gas marketing and pricing system. The future informational letter will deal with all applications under the Gas Resources Preservation Act, including those for greater than 3 billion cubic metres. Until a new informational letter is issued, the handling of such applications will be generally in accordance with the system which has been used for the last several years.

## Requirements of Applications

Applications to remove gas from Alberta in volumes of less than 3 billion cubic metres will require the following information:

1. Name of applicant.
2. Identification of market(s) to be served.
3. Total volume to be removed and expected rates of removal.
4. Duration of removal period.
5. Indication of the source of the gas to be removed. (Names of fields or areas, if available.)
6. Point of removal from Alberta.
7. Plans for transporting the gas.
8. For removals to other parts of Canada, an indication as to whether distributor contract carriage arrangements are available in the region in which the gas will be marketed.
9. A summary of the pricing arrangements for the applied-for gas.

## Method of Processing Applications

### A. Applications Involving Removal of Less Than One Billion Cubic Metres and a Removal Period not Exceeding 24 Months

- o Where items 1 through 9 have not been satisfactorily addressed in the application, a deficiency letter will be sent and processing of the application will be delayed.

- Where items 1 through 9 have been satisfactorily addressed in the application, the ERCB will, because of the small volume and short time period, assume that no party could be directly and adversely affected. It will immediately seek a Ministerial Approval (MA) without giving notice for hearing or objection.
- Upon receipt of the requested MA, the permit will be issued immediately. The permit will be greatly abbreviated and will deal with most of the conditions by reference to the application which is being granted.
- Particulars of the permit will be included in a monthly bulletin which will list all removal applications filed with the ERCB and will be distributed to parties indicating an interest in such matters.

The objective of the ERCB will be to handle these short-term small-volume requests in about one week from the filing of a completed application to the issuance of a permit.

## B. Applications Involving Removal of Greater Than One Billion Cubic Metres But Less Than Three Billion Cubic Metres or a Removal Period Exceeding 24 Months

- Where items 1 through 9 have not been satisfactorily addressed in the application, a deficiency letter will be sent and processing of the application will be delayed.
- Where items 1 through 9 have been satisfactorily addressed in the application, the ERCB will give consideration as to how the application should be processed having regard to section 29 of the Energy Resources Conservation Act and may decide to

  (a) handle without public review

  (b) give notice for objection, or

  (c) call a public hearing.
- In cases where the Board sees no need for a public review it will seek the necessary Order in Council (OC).

- In cases where the ERCB believes that notice of filing is warranted, it will publish the notice in the Daily Oil Bulletin within about one week of receipt of the completed application. Where submissions are received from interested parties, the Board will decide whether a hearing is required. If required, it will immediately proceed to hearing; if not, it will seek the necessary OC.
- In cases where the ERCB believes a hearing is necessary, it will immediately give notice of the hearing, will hear the matter, and will seek the necessary OC if it believes the application should be granted.
- Upon receipt of an OC, the ERCB will immediately issue the permit.
- Particulars of the permit will be included in the monthly bulletin.

The time to process these applications, which require OCs in accordance with the legislation, will vary depending upon the particular application and circumstances surrounding it.

Questions or comments respecting this interim policy and any suggestions respecting the long-term policy should be directed to the attention of Mr. Bill Schnitzler at 297-7322.

V. Millard
Chairman

ENERGY AND NATURAL
RESOURCES

Office of the Minister

407 Legislature Building, Edmonton, Alberta, Canada T5K 2B6 403/427-3740

December 2, 1985

Mr. Vern Millard
Chairman
Energy Resources Conservation Board
640 - 5th Avenue S.W.
Calgary, Alberta
T2P 3G4

Dear Mr. Millard;

As you are aware, the Alberta government has recently concluded an agreement with the governments of Canada and other producing provinces on natural gas markets and pricing. The intent of the agreement is to create a more flexible and market-oriented pricing regime with respect to natural gas.

One aspect of that agreement relates to the incrementality of sales which would follow from approval of proposed gas removal permits or export licences. It was agreed that the current incrementality tests are not in the public interest or consistent with the intent of the agreement and should be discontinued.

The government of Canada amended its existing policy and eliminated its "incrementality test" effective November 1, 1985. Alberta agreed to review the wording of the Gas Resources Preservation Act, specifically section 5(3)(c), and, as necessary, amend the legislation to ensure that it does not require new sales to be incremental to existing sales. I intend to introduce legislation at the first sittings of the Legislature to achieve that objective.

The agreement also allows for direct purchase of gas by consumers from producers provided distributor contract carriage arrangements are available for such purchases. To ensure that the requirement is satisfied, it will be government policy to condition any Order in Council or Ministerial Approval authorizing a removal of gas from the province so that removal will not be allowed to commence until contract carriage arrangements are available in the particular market region.

The agreement also makes reference to a review of the National Energy Board surplus tests which is currently underway and which will likely result in significantly freer access for Canadian gas to export markets. The Alberta government agreed to a review of the surplus tests used in this province. I am therefore requesting that the ERCB review its procedures and formulae currently used in the administration of sections 5(3)(a) and (b) of the Gas Resources Preservation Act, and make any modifications considered necessary or advisable in the public interest.

I am advising the ERCB of these recent developments and plans in order that you may be aware of them in your consideration of removal applications.

Yours truly,

John Zaozirny
Minister

APPENDIX B
FORM OF PERMIT AMENDMENT*

## THE PROVINCE OF ALBERTA

## GAS RESOURCES PRESERVATION ACT

## ENERGY RESOURCES CONSERVATION BOARD

IN THE MATTER of a permit to
Societe quebecoise
d'initiatives petrolieres
authorizing the removal of gas
from the Province

## AMENDMENT OF PERMIT NO. SQ 83-1C

(Amending Permit No. SQ 83-1)

WHEREAS Societe quebecoise d'initiatives petrolieres is the holder of Permit No. SQ 83-1 authorizing the removal of gas from the Province; and

WHEREAS Societe quebecoise d'initiatives petrolieres has applied to the Energy Resources Conservation Board to amend Permit No. SQ 83-1; and

WHEREAS the Lieutenant Governor in Council has given his approval by Order in Council numbered O.C. and dated .

THEREFORE, the Energy Resources Conservation Board, pursuant to the Gas Resources Preservation Act, being chapter G-3.1 of the Revised Statutes of Alberta, 1980, hereby orders as follows:

1. Permit No. SQ 83-1 is amended.

2. Clause 2, subclause (a) is amended by striking out "6 108 000 000 cubic metres" and by substituting "7 480 400 000 cubic metres".

3. Clause 2, subclause (b) is amended by striking out "1 118 000 cubic metres during the period 1 November 1984 to 31 October 1997" and by substituting "1 403 000 cubic metres during the period 1 November 1985 to 31 October 1997"; by striking out "933 000 cubic metres" and by substituting "1 103 000 cubic metres"; and by striking out "408 075 000 cubic metres" and by substituting "512 100 000 cubic metres".

4. Clause 4, subclause (1) is amended by adding the following pools, fields and areas to the list from which gas may be obtained for removal from the Province.

Bonnie Glen
Ferrybank
Gilby
Westerose

---

* This is only a form of permit amendment. The permit amendment, when issued, may have minor variations from that set out here.

5. The following clause is added after clause 12:

13. (1) Attached hereto as Appendix A to this permit is the order of the Lieutenant Governor in Council authorizing the granting of this permit.

(2) This permit is subject to the terms and conditions prescribed by the order of the Lieutenant Governor in Council set out in Appendix A.

MADE at the City of Calgary, in the Province of Alberta, this

ENERGY RESOURCES CONSERVATION BOARD

G. J. DeSorcy
Vice Chairman

**ENERGY RESOURCES CONSERVATION BOARD**

Calgary Alberta

# DOME PETROLEUM LIMITED
# REVIEW AND RESCIND BOARD ORDER NO. MISC 7806
# NORTH COLEMAN GAS BLOCK NO. 1
# COLEMAN FIELD

**Memorandum of Hearing**
**Proceeding 850046**

## 1 INTRODUCTION

The Energy Resources Conservation Board (the Board), pursuant to section 42 of the Energy Resources Conservation Act (the ERC Act), heard evidence to assist in deciding if it should review Order No. Misc 7806 and, if a review were undertaken, if it should rescind the order establishing the North Coleman Gas Block No. 1 in the Coleman Field. Dome Petroleum Limited (Dome) had requested the review and rescission of Order No. Misc 7806.

### 1.1 Submissions

There were five additional submissions filed.

Coseka Resources Limited (Coseka), the Suffolk royalty group, and Scurry-Rainbow Oil Limited (Scurry-Rainbow) appeared at the hearing to oppose the request, while Norman Theodore Wudel, represented through his solicitor, supported Dome's request. Chevron Canada Resources Ltd. (Chevron) appeared for purposes of cross-examination and argument only.

Coseka, the operator of the North Coleman Gas Block No. 1, participated on behalf of itself and various other working interest owners in the block, namely, ANR Production Company, Mutual Exploration Fund, Placer CEGO Petroleum, Brent Resources Group Ltd., Norcen International Ltd., 258260 Alberta Ltd., and Lonlife Resources Limited.

The Suffolk royalty group, consisting of Millard R. Vandergrift, Howard J. Fogarty, Oilmen's Wellsite Services Ltd., Vanguard Petroleums Ltd., and 240689 Alberta Ltd., hold an overriding royalty interest in seven sections within the North Coleman Gas Block No. 1, and led evidence and supported the argument of Coseka.

Scurry-Rainbow and Plains Petroleums Limited are working interest owners within the block, while Norman Theodore Wudel and Chevron represent overriding royalty interests within certain sections of the block.

### 1.2 Hearing

The hearing was held on 2 and 3 January 1986, in Calgary, Alberta, before a division of the Board comprising C. J. Goodman, P.Eng., L. A. Bellows, P.Eng., and acting Board Member H. J. Webber, P.Eng.

## 2 BACKGROUND TO ORDER NO. MISC 7806 ESTABLISHING THE NORTH COLEMAN GAS BLOCK NO. 1

In 1978, Coseka applied to the Board for the formation of a fifteen-section gas block for production from the Rundle Group and Palliser Formation, and to suspend Part 4 of the Oil and Gas Conservation Regulations within the applied-for area to provide spacing pattern flexibilities and eliminate the off-target penalty for a well located within the applied-for block area in legal subdivision 4 of section 23, township 9, range 4, west of the 5th meridian (4-23 well).

The Board registered the application as Application No. 780199, advertised the suspension of Part 4 and, after no objections were received, issued Order No. Misc 7806 establishing the North Coleman Gas Block No. 1 and suspending the operation of Part 4 of the Oil and Gas Conservation Regulations within the block.

As shown in the attached figure, fifteen sections form the North Coleman Gas Block No. 1 in township 9, range 4, west of the 5th meridian: sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, and 27.

From evidence submitted at the hearing, it appears that the following overriding royalty interests are held by participants at the hearing:

a) in sections 3, 10, 15, 22, 23, 24, and 27, the Suffolk royalty group holds a 3 per cent overriding royalty interest, and

b) in sections 1, 2, 11, 12, 13, 14, 25, and 26 Dome holds a 2 per cent overriding royalty interest, Chevron a 2.5 per cent overriding royalty interest, and Wudel a 0.5 per cent overriding royalty interest.

## THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives<br>(Abbreviations Used in Report) | Witnesses |
|---|---|
| Dome Petroleum Limited (Dome)<br>K. F. Miller | H. L. Riggleson<br>K. R. Jepson |
| Coseka Resources Limited, ANR Production Company, Mutual Exploration Fund, Placer CEGO Petroleum, Brent Resources Group Ltd., Norcen International Ltd., 258260 Alberta Ltd., and Lonlife Resources Limited (Coseka)<br>R. W. Thompson | L. D. Driscoll, P.Eng.<br>R. D. Jones, P.Geol. |
| Scurry-Rainbow Oil Limited and Plains Petroleums Limited (Scurry-Rainbow)<br>L. L. Conner | |
| Millard R. Vandergrift, Howard J. Fogarty, Oilmen's Wellsite Services Ltd., Vanguard Petroleums Ltd., and 240689 Alberta Ltd. (Suffolk royalty group)<br>W. H. Kennedy | R.S.C. Blackett, P.Eng.<br>R. H. Kary |
| Norman Theodore Wudel (Wudel)<br>T. M. Hughes | |
| Chevron Canada Resources Ltd. (Chevron)<br>L. C. Fontaine | |
| Energy Resources Conservation Board staff<br>C.J.C. Page<br>V. J. Vogt<br>L. W. Elsner, P.Geol. | |

On 8 January 1985, Dome requested that the Board review and rescind the subject Misc order. Dome submitted that the overriding royalty interests in the North Coleman Gas Block No. 1 are not now common, and were not common at the time of Coseka's 1978 application. Dome believed that this inconsistency in royalty interest should be sufficient grounds to terminate the gas block. However, this contention was withdrawn at the hearing.

By letter to Dome dated 13 June 1985, the Board denied Dome's request. By letter dated 12 July 1985, Dome applied, pursuant to section 43 of the ERC Act, for the Board to hold a hearing to reconsider its decision to deny the request.

In view of Dome's second request, and information which came to the Board's attention with respect to a lack of common ownership of section 25, township 9, range 4, west of the 5th meridian (section 25), within the block, the Board decided to call a hearing to give Dome's request for a review further consideration.

## 3 PRELIMINARY MATTERS

Coseka, in a preliminary motion to deny the request for review without proceeding further, raised three matters which it said were essentially of jurisdiction. It stated that Order No. Misc 7806 was granted in 1978 and, therefore, any request for a hearing pursuant to section 43 of the ERC Act should have been made within 30 days of the order.

Coseka further argued that if the Board were using its review powers under section 42, Dome had no status to apply, as its rights as a gross overriding royalty interest holder are contractual in nature, and the proper place to resolve any issues would be before the Courts.

Coseka further indicated that any rights claimed by Dome may or may not be affected, depending upon the outcome of a dispute which is presently before the Courts. This Coseka motion was supported by Scurry-Rainbow and the Suffolk royalty group.

Dome responded that it was not asking the Board to review the original issuance of the gas block order but rather, pursuant to section 42, to review the need for the gas block order today. Dome submitted that the Board has an on-going jurisdiction to review.

Dome indicated that it was not asking the Board to consider Dome's contractual rights but, because its rights may potentially be affected as a result of a dispute which is presently before the Courts, asked the Board to rescind the block order if the block is not necessary today.

Dome further indicated that it was not asking the Board to determine the effect of the block, which is a matter for the Court, but to assess the need for the block order today.

The Board staff submitted that the Board was hearing the matters on its own motion, pursuant to its review powers under section 42 of the ERC Act, which gives an on-going review power. Pursuant to section 42, the Board is under no obligation to consider Dome's requests and therefore the question of status does not arise.

The Board concluded that under section 42, it could decide to review at anytime and that any party, whether or not directly affected, might request the Board to review, and that a decision to review is totally within the Board's discretion.

In this instance, the Board believed it should hear additional evidence and argument before deciding whether or not a review should be granted, and accordingly dismissed the motion that the request for review be denied without proceeding further.

## 4 POTENTIAL ISSUES

Evidence was led respecting the following matters raised as potential issues:

- common ownership within the block,
- off-target status of the 4-23 well,
- impact of the block on conservation and equity,
- advertisement of original application for the block order,
- initial validity of block order, and
- intervening amendments to the regulations with respect to gas blocks and productions spacing units (PSUs).

### 4.1 Common Ownership

Coseka indicated that, although at the time of the block's formation the working interest owners were common, section 25 had subsequently been farmed out and, at the time of the hearing, had a different ownership. Coseka said it would attempt to rectify this to make the ownership common again.

It submitted, however, that if common ownership could not be obtained this would not be grounds for rescinding the block, but rather for carving out the offending section. Pursuant to an undertaking given at the hearing, the Board was advised on 16 January 1986 that the working interest owners had agreed that the ownership of section 25 would be the same as the rest of the block, and an agreement to that effect was being circulated for execution.

Dome and Wudel submitted that the lack of common ownership was a change in circumstance warranting a review. Dome further submitted that, once a ground for review was established, the first test had been passed and Coseka must show the need for the block today.

The Board finds that, although the ownership was common at the time the block order was issued, there was a change in the ownership which would have been grounds for carving section 25 out of the block. However, as a result of a Coseka undertaking and the evidence presented, the Board is satisfied that there is again common ownership throughout. The Board sees no need to review the block order on the grounds of ownership, because the ownership is now common.

### 4.2 4-23 Well Target Status

Dome said the 4-23 well was off target at the time the block was formed, and that waiving the off-target penalty was the primary reason for formation of the block. Dome questioned whether, in view of the most recent off-target regulations, the well is still off target and, if not, submitted that the basic reason for the block no longer exists. Dome suggested that the Board could look at its public records to determine if the well were actually off target and, even if the well were still off target, Coseka could apply for a special drilling spacing unit to obtain off-target penalty relief rather than continuing the block.

Coseka argued that, although applying for special drilling spacing units was one method of obtaining off-target penalty relief, the existence of the block gave the same relief to the operator and was administratively simpler because it was not necessary to submit a new application every time a well was drilled.

The Board has determined that the 4-23 well is in fact still off target. Accordingly, this is not a change in circumstance that would warrant a review of the order. Even if this were not so, the Board accepts Coseka's contention that the gas block is an administratively simple way to obtain off-target penalty relief, and the fact that another method of so doing exists would not in itself be grounds for review.

### 4.3 Impact of the Block on Conservation and Equity

Although this issue would primarily relate to whether or not the block should be rescinded, both Dome and Wudel raised the need for a block as a matter for the Board to consider when deciding whether a review is warranted.

No party established a conservation or equity reason to either continue or rescind the block.

Coseka and the Suffolk royalty group contended that the block was necessary to allow production to be taken from any wells without consideration for gas production rate allowables, but during cross-examination it became clear that there were no allowables on Coleman Field gas wells and this was not a valid reason.

Coseka also contended that the block was necessary to allow it to avoid off-target penalties on some of the wells and to provide flexibility in drilling of future wells to attempt to establish maximum reservoir thickness. However, Coseka admitted that there were other methods by which off-target penalty relief could be obtained.

Coseka also contended that the block was necessary in order to continue the leases. However, during cross-examination it became clear that the continuation of the leases would be determined by the Department of Energy and Natural Resources, and that continuation of the block did not necessarily affect the continuation of the leases. Additionally, all parties agreed that this issue may be irrelevant as it may not be a matter within the Board's jurisdiction.

Dome maintained that the block order ought to be rescinded unless it could be shown that there would be some positive conservation or equity effect of its continuation.

Coseka maintained that the block order exists, and therefore it ought to continue unless some adverse effect on conservation and equity can be shown.

The Board finds no compelling reason based on conservation or equity which would convince it to review on the basis of need for the block. However, even if some such ground for a review had been brought forward, the Board expects it would have reviewed the order on the basis suggested by Coseka. That is, the block order exists and the Board would have to find some adverse effect on conservation or equity before rescinding the order.

### 4.4 Advertisement of Original Application

Dome suggested that the original application for a block may not have been advertised, and there is no record of notice being sent to the gross overriding royalty interests. It suggested that this might be grounds for review.

During examination, Dome confirmed that it had been aware of the existence of the block since at least mid-1983. Dome said it is directly and adversely affected by the withholding of royalties as a result of the on-going law suit. However, it did not suggest it was directly and adversely affected at the time the block order was issued.

The Board notes that, pursuant to section 43 of the ERC Act, if a party who is affected by an order of the Board does not receive notice of an application it may, within 30 days of the date of any resulting order, apply to the Board for a hearing of the matter. More than 30 days have passed since issuance of the block order, and by its own evidence, more than 30 days have passed since Dome received notice of the existence of the block order. Therefore, any remedies Dome may have had with respect to lack of notice have expired.

Additionally, the Board notes that the withholding of any royalty payments is a matter to be determined on the basis of the contract between Dome and the working interest owners, and is not a matter over which this Board has jurisdiction. Dome therefore does not appear to have been directly and adversely affected so as to be entitled to notice pursuant to section 29 of the Oil and Gas Conservation Act.

### 4.5 Initial Validity of the Block Order

During argument, Wudel contended that the Board, in assessing the continued need for the block, should look at whether the block was validly constituted under the regulations in effect in 1978. At that time, section 5.110 of the regulations provided that "a block shall contain only whole, contiguous production spacing units of common ownership". Section 5.020 provided that the Board, "on application and on such bases as seem proper to it in a particular case, may establish by order, one or more drilling spacing units as a production spacing unit for a gas well, with respect to a specified pool, and designate its producing well". Section 5.030(2) provided that an application for the establishment of a PSU shall be in the form prescribed by the Board.

During cross-examination, Coseka confirmed that it had never applied for production spacing units in the North Coleman Block.

Wudel therefore contended that the block had not been properly formed in 1978. Additionally, he indicated that a multiple production spacing unit is with respect to a specified pool. Coseka's evidence was that the two pools did not completely overlie each other in that the pool in the Palliser Formation was of a much more limited areal extent than the pool in the Rundle Group. Therefore, because the block referred to both pools, and they could not have had common PSUs at the time of the application, once again the block would be invalid.

Dome supported this argument; however, both Dome and Wudel indicated that they were not asking the Board to retroactively revoke the block order.

Coseka indicated that the Palliser and Rundle pools in this area had been commingled. Coseka also submitted that there is at least some implication by the existence of the Board order that PSUs were assumed to exist.

The Board acknowledges that in 1978 there may have been less than strict compliance with sections 5.020 and 5.030(2) of the regulations. However, even if an irregularity existed, the effect of any irregularity after this length of time is a legal question and not a matter to be determined by an administrative tribunal. Further, both Dome and Wudel asked the Board to look at the block order on a current basis, and did not ask the Board to retroactively consider or rescind the order.

In view of the fact that no party questioned the existence of the order, the Board does not believe that this is a ground for review.

### 4.6 Intervening Amendments to the Regulations with Respect to Blocks and PSUs

During argument, Wudel submitted that the present regulations with respect to the formation of blocks conflict with the definition of block in the Act.

In the Oil and Gas Conservation Act

> "block" means an area or part of a pool consisting of production spacing units grouped for the purpose of obtaining a common, aggregate production allowable.

At the time the block was formed, regulation 5.110 provided that

> 5.110 A block shall contain only whole, contiguous production spacing units of common ownership.

This was amended by AR 15/84 to read

> 5.110 A block shall contain only whole, contiguous drilling spacing units of common ownership.

Wudel maintained that where there is a conflict between the Act and a regulation, the Act would take precedence, and therefore, a block must consist of production spacing units.

He further indicated that at the time the block was formed, the relevant regulation read as follows:

> 5.020 The Board, on application and on such basis as seem proper to it in a particular case, may establish by order one or more drilling spacing units as a production spacing unit for a gas well with respect to a specified pool and designate its producing well.

By AR 416/83, the following requirements with respect to PSUs were added:

> 5.021(1) The area of a multiple production spacing unit for a gas well shall not exceed 4 sections.
>
> (2) A multiple production spacing unit for a gas well shall not extend more than 2 sections in any direction.

Wudel therefore maintained that the block, as presently constituted, could not be formed under today's regulations as there is no configuration which would allow the formation of a 5 x 3—fifteen section block.

He suggested that the amendment to the regulations reflected a change in policy which would warrant a review, and further suggested that if a review were conducted, the block should be made to conform to the present regulations.

As noted in section 4.5, Wudel argued that a multiple PSU was with respect to a specified pool, rather than an area of land. Because the pool in the Palliser Formation is of limited areal extent, he argued it may not be appropriate to have a block order covering the Palliser Formation over all 15 sections.

With respect to the retroactive effect of changes to the regulation, he questioned whether the establishment of a block by this Board gave Coseka any rights, or whether it was simply an administrative matter.

Dome supported Wudel's position.

Coseka contended that if there has been a change in policy, or in regulation, such change ought not to affect the rights of Coseka which derive from the existing orders.

Coseka further submitted that the block as it currently stands does not offend the regulations insofar as they require contiguous drilling spacing units. It took the position that an administrative tribunal such as the Board has no authority to declare its regulations ultra vires, and therefore, while the regulations are in force, the Board must apply them. It submitted that with respect to the change in policy, the existing policy, as reflected in the regulations, supported the continuance of the block. It indicated that if separate PSUs for each zone are required, there was nothing to prohibit the Board from granting such orders to maintain the block. While this might curtail the size of the block, it would not necessarily mean that the block had to be terminated.

The Board notes that the issues raised appear to flow from the requirement as stated in the definitional section of the Oil and Gas Conservation Act that a block consist of production spacing units.

The Board notes that this definition was introduced into the Oil and Gas Conservation Act in 1967. The Board further notes that, pursuant to regulation 5.100, in 1971 the Board could only establish blocks in oil pools. It was not until 1974 that blocks could, by regulation, be established in gas pools.

Additionally, the definition of block in the Act refers to production spacing units which are grouped for the purpose of obtaining a common aggregate production allowable. Although oil wells all have allowables under the proration system, allowables are applied to gas wells in limited circumstances only. The concept of an allowable is one that applies almost exclusively to oil wells. Accordingly, pursuant to section 1(2) of the Oil and Gas Conservation Act, the Board is satisfied that the definition of block, as contained in the Act, refers only to oil blocks, and not to a block created in a gas pool.

Because the Board is satisfied that the definition of block in the Act does not apply to gas blocks, it appears that section 5.110, which provides that a block shall contain only whole contiguous drilling spacing units of common ownership, may be applied to gas. Therefore, the Board finds that the gas block, as constituted today, appears to comply with the regulations and with the existing policy, in that the gas block is composed of 15 whole contiguous drilling spacing units of common ownership.

On this basis, the issue as to whether there should be one or two blocks because there are two pools, is no longer relevant. There is nothing to require that a pool be specified for a drilling spacing unit.

The Board recognizes that the 1983 amendment to the regulations may have implied a change in rules respecting blocks. However, as a result of the 1984 amendment, the rules changed again and the subject gas block conforms to the present requirements.

Accordingly, the Board does not find the change in regulations to be grounds for review of the gas block order.

## 5 CONCLUSION

On the basis of the evidence received and for the reasons set out above, the Board finds no significant reason to cause it to review the existence of the gas block. Accordingly, a discussion of the merits as to whether the gas block should be rescinded is not required.

DATED at Calgary, Alberta, on 27 February 1986.

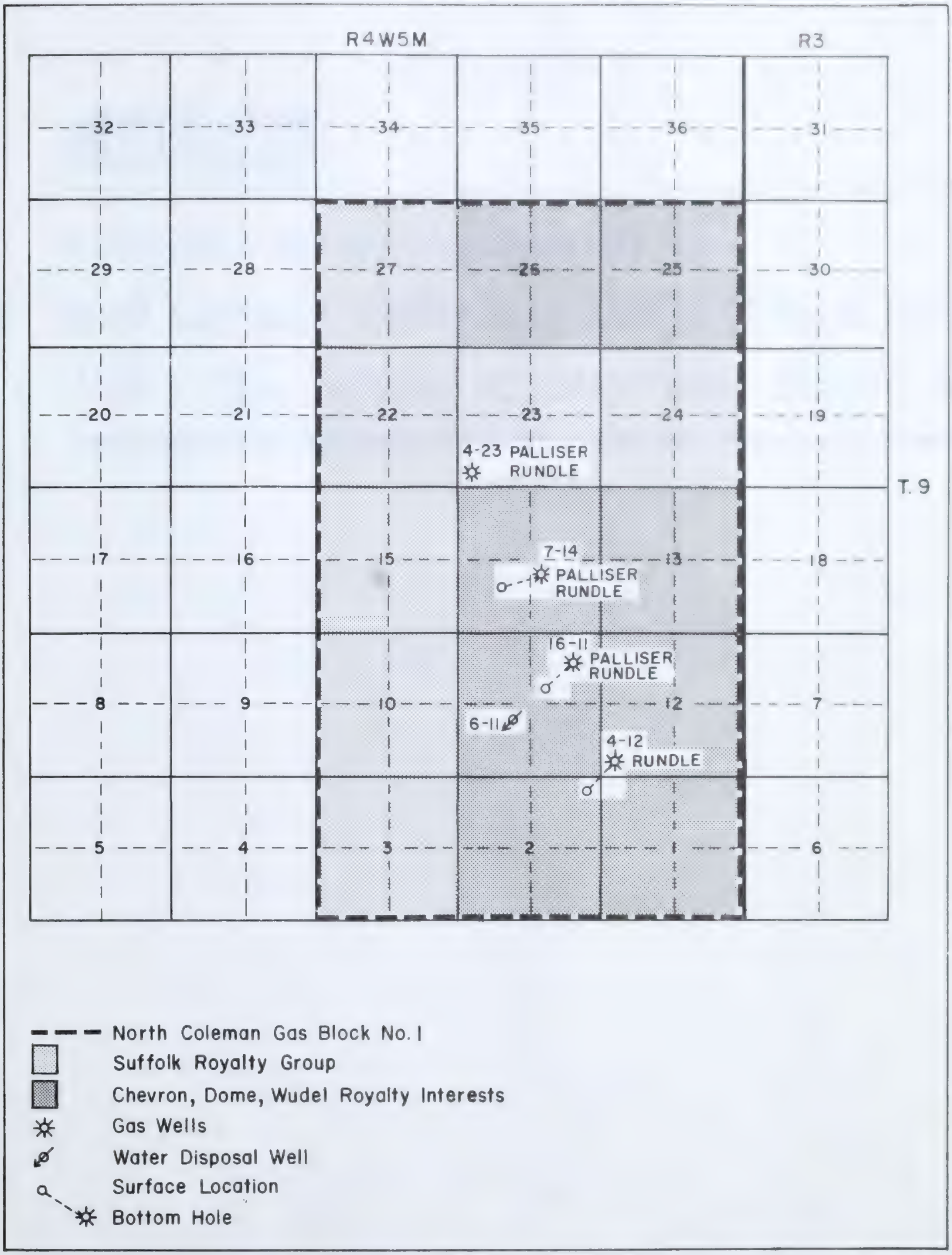
ENERGY RESOURCES CONSERVATION BOARD

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

L. A. Bellows, P.Eng.
Board Member

H. J. Webber, P.Eng.
Acting Board Member



NORTH COLEMAN GAS BLOCK NO. 1
with overriding royalty interests illustrated

ERCB

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# A Report on an Application by Shell Canada Limited to Drill a Critical Sour Well in the Jutland (Castle River South) Area

June 1986

# ENERGY RESOURCES CONSERVATION BOARD
# DECISION REPORT

Report D 86-2 published June 1986

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# 1 THE APPLICATION AND HEARING

## 1.1 The Application

Shell Canada Limited (Shell) applied pursuant to Part 6 of the Oil and Gas Conservation Act for a licence to drill the well, SHELL JUTLAND 14-3-3-2 (the well), directionally from a surface location in legal subdivision 2 of section 10, township 3, range 2, west of the 5th meridian, to a projected bottom-hole location in legal subdivision 14 of section 3, township 3, range 2, west of the 5th meridian. The purpose of the well would be to evaluate the hydrocarbon potential of the Mississipian and Devonian formations. Shell estimates that if the well is successful and encounters sour gas, the maximum hydrogen sulphide ($H_2S$) concentration would be 32.7 per cent.

The location of the proposed well and key geographical and topographical features in the surrounding area are shown in Figure 1.

## 1.2 Preliminary Meetings

At about the same time the application to drill the well was received, a number of individuals and public interest groups expressed concerns to the Board regarding the proposed Jutland well. As a result, a meeting was held at the offices of the Board in Calgary on 31 October 1985 to discuss, among other things, the need for a public hearing of this application, the terms of reference for such a hearing, and the need for additional information and particulars to complete the application. The decision of the Board resulting from this meeting is detailed in a report dated 14 November 1985 and entitled "Memorandum of Decision; Procedures Meeting; Application 851037".

As a result of the 31 October 1985 meeting, the Board decided that there was a need for a public hearing of the application, and that certain additional information was required from Shell to supplement and complete the application. Further, the Board determined the terms of reference for the public hearing. In summary, the Board decided as follows:

- the hearing would not be for the purpose of reviewing the re-zoning decision made by the Government (this matter is discussed further in Section 2.2),
- the hearing would be for the purpose of considering the proposed Jutland well and its potential impacts, but not to consider impacts which might occur from possible future developments, and
- the Board would consider relevant matters that are within the Board's jurisdiction, which include
  - the need for the well,
  - safety precautions during drilling, and
  - the impact on the environment, including wildlife, of the proposed well and access road, but not including broad issues as to the present state or long-term management of wildlife in the area.

An additional meeting was held at the offices of the Board on 6 December 1985 to discuss the eligibility of some interveners for local interveners' costs. The results of this meeting are detailed in a report dated 13 December 1985 entitled "Memoradum of Decision; Local Interveners' Costs Meeting; Application 851037".

## 1.3 Interventions

The Board received interventions from a number of individuals and public interest groups including several groups based in Montana. The individuals included area residents, recreational users of the South Castle River area, and those with a commercial interest in the area. The views of the participants in the hearing are summarized in Section 4 of this report.

## 1.4 The Hearing

The hearing of this application was originally scheduled for 6 January 1986 in Calgary. As a result of requests by several interested parties for postponement and relocation, the hearing took place on 27-30 January 1986 in Pincher Creek before G.J. DeSorcy, P.Eng., L.A. Bellows, P.Eng., and E. J. Morin, P.Eng.

Table 1 shows those who appeared at the hearing.

# 2 BACKGROUND

## 2.1 South Castle River (Jutland) Area

The South Castle River Valley is located in southwestern Alberta approximately 30 kilometres (km) southwest of the town of Pincher Creek. The southernmost upper reaches of the valley form a portion of the northern border of Waterton Lakes National Park (Waterton Park). The proposed well site is located in this valley near the confluence of Font Creek and the South Castle River, as shown in Figure 2.

The valley landscape provides habitat for ungulate populations as well as large carnivores such as grizzly and black bears, and cougar. The South Castle River watershed also provides for a wide range of recreational opportunities such as hunting, fishing, hiking, and snowmobiling. The area currently experiences relatively low levels of recreational use due to limited access into the area.

Some salvage logging was conducted in the late 1970s which resulted in the construction of the road which now provides the primary access to the area. Reclamation attempts on the upper portion of this road have been partially successful.

TABLE 1 THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Shell Canada Limited (Shell)<br>K. F. Miller | J. R. Tilbe, P.Eng.<br>D. R. Brundrit, P.Eng.<br>R. T. Staysko, P.Eng.<br>J. D. Scott<br>Dr. D. A. Mead<br>R. Webb<br>B. N. McLellan<br>Dr. D. M. Leahey |
| Town of Pincher Creek (the Town) | Mayor, J. Teran |
| Pincher Creek and District Chamber of Commerce | F. Cook |
| Diamond Hitch Outfitters (Diamond Hitch)<br>S. R. Miller | M. Judd<br>Dr. B. L. Horejsi<br>D. W. Mayhood |
| Alberta Wilderness Association (AWA)<br>D. Pachal | R. Maw<br>Dr. C. Jonkel<br>M. Fairbarns<br>J. Main<br>E. Dunn<br>Dr. V. Geist<br>S. Marty |
| Timbermountain Packtrain | D. Simpson |
| G. Hoffman | |
| Pincher Creek Area Environmental Association (the Association) | S. Taylor<br>D. McGlynn<br>D. Blackburn |
| Parks Canada | B. Lieff<br>B. F. Leeson<br>M. Winkler |
| Waterton Biosphere Reserve Management Committee (the Committee) | L. Frith<br>C. Russell<br>B. Lieff |
| National and Provincial Parks Association of Canada (NPPAC) | D. Dodge |
| Sierra Club (Alberta) | D. Kariel |
| Sierra Club (Montana) | L. Kreck |
| L. Kreck | |
| R. Bailey | |
| Lethbridge Fish and Game Association | R. Goodwin |
| D. Sheppard | |
| R. F. Wolf | |
| Montana Wilderness Association | J. Frederick |
| Local 835 of the Energy and Chemical Workers Union (the Union) | L. Ferguson<br>G. Dorge<br>M. Cleland |

**TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)**

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Pincher Creek Snowmobile Club (the Club) | R. Reed<br>D. Reed<br>G. Lang |
| * J. Tweedie | |
| * Glacier—Two Medicine Alliance | J. Jessepe |
| ** Alberta Fish and Game Association | |
| ** Federation of Alberta Naturalists | |
| ** Great Bear Foundation | |
| ** E. Jones | |
| ** C. Wallis | |
| Energy Resources Conservation Board staff<br>A. Gervais<br>R. Cox, P.Eng.<br>L. Holizki, P.Eng.<br>B. Madu, E.I.T.<br>D. Shaw<br>Dr. R. Wallace | |

---

* Denotes parties that were present for a portion of the hearing but were unable to remain to present their submission.

** Denotes parties that made submissions but were not present at the hearing.

Seismic operations conducted in the Font Creek area in the 1950s identified a potential structure for the trapping of natural gas. Although natural gas exploration has proven successful to the west in the Flathead Valley of British Columbia and to the east in the Waterton Gas Field, no drilling has been conducted in the South Castle Valley to date.

### 2.2 Castle River Sub-Regional Integrated Resource Plan

In 1977 the Alberta Government approved a document entitled "A Policy for Resource Management of the Eastern Slopes" (Eastern Slopes Policy). The purpose of the Eastern Slopes Policy is to provide direction for integrated resource management and planning for the entire Eastern Slopes region. This policy was revised in 1984. The Castle River Sub-Regional Integrated Resource Plan (Integrated Resource Plan) was approved by the Alberta Government in June of 1985 in acknowledgement of the importance of the Castle River area to watershed protection and recreation.

The Integrated Resource Plan identifies specific zones and the associated activities which may or may not occur within these zones. Within the South Castle Valley, three zones have been designated: a Prime Protection Zone (Zone 1), a Critical Wildlife Zone (Zone 2), and a General Recreation Zone (Zone 4). A designation of Zone 1 is intended to preserve environmentally sensitive terrain and valuable aesthetic resources for the maintenance of watershed and wildland recreation values. Accordingly, petroleum and natural gas exploration activities are not normally permitted within this zoning area, except under very special circumstances.

The Font Creek area in which the well site is proposed was designated as Zone 1 under the 1977 Eastern Slopes Policy. The 1984 revision to the Eastern Slopes Policy and subsequent approval of the Integrated Resource Plan in 1985 resulted in reclassification of the area of the well site as Zone 4. This designation provides for the protection of watershed, wildlife habitat, and recreational resources. Petroleum and natural gas exploration and development as well as timber production are allowed under special conditions and controls to ensure preservation of recreational opportunities. According to the Integrated Resource Plan, access is to be highly restricted to protect the wild land character of the adjacent Zone 1 and to ensure maintenance of an adequate buffer to Waterton Park.

The South Castle area and associated zoning relative to the proposed well site are shown in Figure 2. Further information regarding the plan and associated zoning can be found in the Alberta Energy and Natural Resources publication "Castle River Sub-Regional Integrated Resource Plan".

## 3 BASIS FOR DECISION

As indicated in Section 1 of this report, the Memorandum of Decision resulting from the 31 October 1985 pre-hearing meeting dealt with the terms of reference for the hearing. The memorandum stated the principle that the Board would consider only those matters which are within its jurisdiction and relevant to the application, and on the basis of the representations made at the 31 October meeting, it set out terms of reference which have been summarized in Section 1.2.

Notwithstanding that a number of participants in the hearing suggested otherwise, the Board is satisfied that the terms of reference established in the Memorandum of Decision are still appropriate. That view is reflected in this section of the decision report which identifies and elaborates on the issues which the Board believes it should address in deciding the application.

The first matter to be reiterated is that the Board does not consider itself to have jurisdiction respecting land zoning designations under the Alberta Government's Eastern Slopes Resource Management policies. The lands on which the proposed well would be located are zoned as General Recreation, which allows for petroleum and natural gas exploration and development under special conditions and controls. The Board is firmly of the view that the matter of the zoning of the land is not an issue to be dealt with in its decision on the application.

A number of participants in the hearing argued that more detailed environmental data was needed and that the Board should have regard for possible future developments in the event the proposed well is successful. The Board indicated in the Memorandum of Decision that it would consider the impacts on the environment of only the proposed well and access road as opposed to possible future developments. For that reason, it also stated that only a general assessment of impacts on the environment, rather than detailed environmental studies, would be required of Shell to complete the application. The environmental information provided by Shell prior to the hearing met that requirement.

The Board remains of the view that, since the well would be exploratory in nature, there is great uncertainty as to whether it would encounter hydrocarbons. It recognizes that there would be little purpose in licensing and allowing a single exploratory well to be drilled if it was clear at the outset that follow-up development and production would not be feasible. This is not the case for the proposed well in that the Government's Integrated Resource Plan designates the lands in question as being suitable for natural gas exploration and development under special conditions and controls.

For the above stated reasons, and because there is no certainty as to the type of future developments which might be proposed, nor indeed that any would be proposed, the Board confirms that it will make its decision solely on the basis of the drilling of the proposed well including construction of the proposed well site, upgrading of the access road, and a possible limited production test.

It is important to note that any possible future developments, be they additional wells, pipelines, or other facilities, would require further application to the Board. The applications would be subject to public review at the time they are made. Respecting the contention that the present application should not be assessed on an "isolated" basis and that the possibility of future developments should be evaluated as part of it, the Board, as indicated earlier, does not agree. However, if the proposed exploratory well is approved, proceeds, and is successful, and if substantial follow-up developments are planned, the Board would not expect to consider future applications on a single-application basis. Additionally, depending on the extent of any future proposed developments, the Board might require more detailed environmental data.

In dealing with this application, the first issue the Board will address is

- the justification or need for the well.

In this respect, the Board does not consider the test to be one of whether the drilling of the well is an absolute requirement on behalf of society. Rather, the Board sees this issue as dealing with the intended purpose of the well and to some extent as a measure of the benefits which society could derive from the well, if successful. It is against these potential benefits that the "costs" of the well, including threats to public safety and impacts on the public and the environment, must be weighed. In assessing these costs, the Board will address

- the potential impacts on the environment of the drilling and possible limited testing of the proposed well at the proposed site and of the access road, and
- mitigative measures which might be taken to reduce such impacts.

The "environment" in this respect includes the land, surface waters, air, vegetation, fish and wildlife. However, it must be again emphasized that the Board will be assessing only the impacts of drilling the specific applied-for well and the proposed access road and will not be reviewing potential long-term impacts which could result from possible future developments. It should also be noted that there are elements of these impacts and possible mitigative measures where the Board does not believe it has jurisdiction, such as the location of the access road or its method of construction. Where relevant to the assessment of the application, the Board will identify and comment on these elements in this decision report.

The lands in question are used by the general public for recreational purposes such as hiking, hunting, and fishing and by commercial users such as licensed guides and outfitters who bring clients into the area primarily by horse train. The Board will thus look at

- the potential impact of the proposed well and access road on commercial users, and
- the potential impact on non-commercial recreational users.

The former would not be for the purpose of assessing any possible compensation, but only for determining the overall costs to society that could result if the well were drilled.

In dealing with the subject application, it must also be recognized that the proposed well would be a critical sour well as defined by the Board in Draft Interim Directive ID 84- , "Blowout Prevention at Sour Wells". This is because of the high $H_2S$ release rate which could potentially take place from the well, and also because it is located in a recognized recreation area where development and production of oil and gas resources would be permitted only under special conditions and controls.

Having this in mind the Board will next assess

- the precautions to be taken during the drilling of the well to safeguard against the possibility of a blowout, and
- the actions to be taken in the event of a blowout and the impacts that might result.

Finally the Board, as it did in its Memorandum of Decision, emphasizes that it has jurisdiction to deal only with the Alberta public interest. Accordingly, it will limit its examination to evidence which relates specifically to the public interest of the province and its citizens and will deal with potential impacts beyond the provincial boundaries only to the extent that such impacts would affect the public interest of this province.

## 4 POSITIONS OF THE PARTICIPANTS

The Board received written submissions from 27 intervening parties of which 20 made verbal presentations at the hearing. Of the 27 interveners, 4 supported the Shell application. This section summarizes the views or positions of each participant.

### 4.1 Shell Canada Limited

**Justification for the Well**

Shell stated that seismic studies suggest a drillable prospect exists in the Jutland or South Castle area. It acquired the appropriate petroleum and natural gas licence from the Alberta Crown in 1969, but was unable to acquire surface access until approval of the Integrated Resource Plan in 1985. Shell stated that its objective is a potential deep natural gas accumulation similar to but significantly smaller than the Waterton Field. It stated that there could be as many as four prospective horizons in two thrust sheets, comprised of one Mississippian and one Devonian formation in each sheet. It said the well is located in the optimum location to test the lower sheet and find out if it contains Devonian rock, and also to determine if the upper sheet exists by drilling through a small piece of it.

Shell stated that the well was exploratory in nature with about a 10 per cent chance of success, but estimates that the prospect could be as large as 40 square kilometres (km$^2$) with possible gas reserves of up to 8450 million cubic metres.

Shell stated that its major business is oil and gas production and therefore to stay in business it must replace depleting gas reserves, both for itself and for Canada. Although there was some discussion that a discovery at Jutland and subsequent production would replace declining reserves at its Waterton Gas Plant, Shell emphasized that the proposed Jutland well was for exploratory purposes only and should not be considered in relation to present gas processing capabilities at the plant.

Shell stated that it was currently drilling a well in British Columbia, SHELL GROUSE 8-75-G-82-G-1 (the Grouse well), for similar objectives and indicated that if this well failed to encounter Paleozoic rock, the proposed Jutland well would not be drilled. Shell anticipates information from the Grouse well to be available by September or October of 1986, but indicated that approval of the current application is required now to provide a window of opportunity for lease and access road construction from July to December of 1986.

### Construction and Reclamation

Shell stated that prior to obtaining its Mineral Surface Leases (MSL) from the Government for lease and access road construction and occupation, it had consulted with regulatory agencies and had submitted a report of its initial environmental investigation. It said that  no surface disturbances would occur in the South Castle or Font Creek area until the well licence was approved and the decision to drill the proposed Jutland well, pending the results of the Grouse well, was made. Shell added that all construction would be done in a professional manner under Shell's supervision with close co-ordination with regulatory agencies to minimize the disturbance.

Shell identified four different construction activities, the access road, well site, campsite, and drilling waste disposal site. Regarding the access road, Shell stated that there is existing access from the junction of Highway 774 up to and beyond the well site depending on the mode of transportation and the seasonal surface conditions. The present and proposed access roads are shown in Figure 2.

Shell suggested that access by conventional vehicle is now possible to the Scarpe Creek junction, and beyond this point with four-wheel drive or all-terrain vehicles. For the purpose of drilling the proposed well, the first 9.3 km of the 27.8-km access road would require some slight regrading and the next 11.5 km would require some upgrading. The next and final 7 km would be over a previously abandoned and reclaimed road and would require rebuilding, with a portable bridge installed to cross the Castle River. Shell proposes the construction of an all-weather road requiring gravel in selected areas only, and would apply a wetting agent for dust control when required. A locked steel gate would be located at Scarpe Creek for access control, and would be manned during the drilling activities.

Shell's mineral surface lease is for a well site of 140 metres (m) by 140 m on an existing cleared area situated on a 15-degree slope. The well site would require some excavation and levelling. Shell proposes to use buried steel tanks as opposed to an on-site sump for containment of drilling fluids. These drilling fluids would be transported to a remote waste disposal site during drilling. The well site would also be bermed to contain any spillage and avoid runoff from the lease.

Shell proposes to locate the remote drilling waste disposal site approximately 600 m north of the well site in an existing cleared area. The site would be approximately 100 m by 100 m and Shell believes that the soil is suitable for a containment pit. Shell proposes to transport drilling waste from the well to this site, and treat and dispose of this material in the conventional fashion. Shell stated  that the perimeter of the site would be fenced and the gate locked to keep out people, wildlife, and cattle.

Shell proposes a camp located near Scarpe Creek to house and feed 30 to 40 drilling personnel for the duration of the drilling of the well. A helicopter for use in emergency situations and infrequent reconnaisance would be located at the camp. Crew transportation from outside the South Castle area to the camp, and from the camp to the well site, would be by personnel carrier to minimize traffic. The possession of firearms, alcohol, drugs, and motorized recreational vehicles at the campsite would be strictly prohibited. Domestic camp sewage would be contained in closed below-ground tanks with the effluent transported regularly to an approved disposal site. Combustible garbage would be incinerated with government-approved incinerators with spark arresters, while non-combustibles would be transported to approved disposal sites.

Shell presented a number of reclamation scenarios depending on whether the proposed well resulted in a dry hole and discontinued access, a significant discovery and continued access, or a marginal discovery with a suspended well requiring intermittent access. Reclamation procedures and corresponding access would be in accordance with the conditions of the MSL but, in general, would involve recontouring, stabilization, and redistribution of salvaged topsoil over the disturbed area. The area would be revegetated with an approved fertilizer-seed mix and legumes, with salvage deadfall spread over the surface to control erosion, enhance vegetation, and restrict access. In some instances local shrubs and seedlings would be planted to accelerate revegetation. Measures planned for access control vary depending upon the scenario, but Shell proposes to restrict access as much as possible. Shell added that snow-plowing and maintenance of the access road would cease when Shell was not active in the area.

### Wildlife

Shell stated that it has long recognized the South Castle as an important wildlife and recreational area. It also recognizes the grizzly bear as a rare species, with low population density subject to slow growth. Mr. B. McLellan appeared on behalf of Shell as an expert in grizzly bear behaviour and identified three ways in which these bears could be affected. These are through habitat loss, displacement by human activities, and human-induced mortality.

Mr. McLellan said that given the existing road right of way and cleared area, habitat loss would be minimal.

Mr. McLellan indicated that there was a variance between individual bears and how they would react to roads, but generally they would avoid them by 50 to 200 m. Around the well and campsites, he suggested that avoidance could be expected in the range of 400 to 800 m. Given the existing access road and use of the area, he estimated that further displacement because of the well, camp, and access road for the 1-year drilling period would be minimal.

Mr. McLellan predicted that human-induced mortality would account for 95 per cent of the potential impact. He added that most grizzly mortalities result from legal hunting, poaching, and conflicts with man due to real and perceived protection of life and property. He said that mortalities due to these causes tend to increase very rapidly with road access.

Mr. McLellan noted that Shell proposes to restrict access and stated that if it does a good job, the long-term impact would be minimal. He added that Shell's proposals for garbage incineration and control of firearms would reduce human-bear confrontations and reduce the risk of human-induced mortality. In the event of such confrontations, Shell stated it would not kill the bear, but rather it would have the bear removed from the area if necessary.

Regarding the effect of drilling and construction activities on other big-game animals of the area, Shell stated that there was limited potential for interaction between the project and bighorn sheep or mountain goats as the closest known range for these animals was greater than 1 km from the well site. Mr. R. Webb, appearing on Shell's behalf as an expert on wildlife other than grizzly bears, estimated that the effect of stress as a contributor to sheep bacterial pneumonia would not be significant. He acknowledged that there would be greater potential for interaction with migrating or summer resident moose, elk, and deer with the well site and road, but suggested they would adjust quickly if not harrassed. Shell added that it would equip its vehicles with high-frequency whistle devices to alert animals on the road and prevent road kills.

Shell stated that it would minimize traffic and helicopter disturbances in the Font Creek Valley near the proposed well site. It added that habitat loss and disturbance of migration could be expected only during snow-free seasons due to lack of wintering habitat. Habitat loss would eventually be restored and, in the case of site abandonment, movement patterns would be reinstated. It also added that, based on Shell's drilling waste disposal and handling procedures, no effect on animals from toxic materials is expected.

In response to questions, Shell said that while the probability of encountering great grey owls along portions of new right of way was low, it might be worthwhile to check this situation. Regarding the long-toed salamander, Shell stated that it would not likely be found at the elevation where the proposed disturbances would occur. Shell concluded that its proposed mitigative measures, particularly regarding limited access, would prevent significant or long-term impacts on wildlife.

### Plantlife and Fisheries

Shell said it recognizes that the southwest corner of Alberta has a great diversity of plants and plant communities. However, the majority of these are not actually rare or unique because they are outliers of ranges that extend into British Columbia or the United States. Shell said that, through discussions with the Resource Planning Branch and Public Lands Division of Energy and Natural Resources, only one ecologically unique plant community was identified near the proposed Shell activities. This is the Big Sagebrush community along the southwest slope of Whistler Mountain. Whereas it acknowledged that individual sagebrush plants may be located near the proposed access road, Shell stated that the bulk of the community and area being considered for an ecological reserve would not be adversely affected.

With respect to the fisheries of the South Castle area, Shell said that the effect of siltation due to road construction would be minimal, since construction is proposed for the fall when water flow is generally low. Siltation effects would thus be local and intermittent. Shell indicated it did not recognize the Scarpe, Jutland, or Font Creeks as important fish-bearing habitat. It added that the only crossing of such habitat would be of the South Castle River by bridge rather than culvert and fill, to minimize siltation.

Regarding native bull trout, Shell noted that it was still abundant in a number of streams and does not consider it to be a rare species. It admitted that the species is susceptible to over-fishing, but suggested the fishing pressure would be reduced during and after drilling as a result of the road closure or access restrictions.

### Commercial and Recreational Use of the Area

In response to concerns of the commercial outfitters, Shell noted that the area of the road and well site is already disturbed. It added that the drilling would occur in less than a 1-year period and the area would not appear appreciably different than its present state. Shell noted the locations of trails commonly used by the outfitters are never closer than 2 km from the proposed well site and that the well site would only be visible from a short section of the trail. Odours and noises from the rig would not likely be detected at these distances. Shell also stated it would work with

Timbermountain Packtrain to ensure the drilling and construction operation did not impair its campsite at the junction of the Font Creek and Castle River, but had no comment with respect to the outfitters' base camp at Scarpe Creek.

Regarding trapping operations of Mr. Hoffman, Shell acknowledged that a short-term interference along the access road may occur. In particular, Shell recognized that winter road use could result in a change of movement patterns of furbearers, but believed it would not result in total range abandonment. Shell stated that it was prepared to discuss and resolve Mr. Hoffman's concerns.

Shell noted the considerable recreational use of the area, particularly between Beaver Mines and Scarpe Creek in July and August, with some snowmobiling and cross-country skiing in the winter. The trails, cutlines, and logging roads south of Scarpe Creek are also subject to significant hiking and motorized activities of a recreational nature. Shell acknowledged that during the possible brief production testing of the proposed well, some odours may be evident for a short period of time, and that some recreationalists using the immediate area would see or hear the drilling operations.

Shell stated that although a requirement of its MSL is to close the road south of Scarpe Creek, it had no jurisdiction over how people would otherwise enter the area. Shell proposes a system of registration boxes and informational pamphlets to make backcountry users aware of its operations and to make it aware of their presence. This system would commence approximately 2 weeks prior to drilling into the critical zone (i.e. the formations which could contain large volumes of $H_2S$) and would be implemented at seven trail locations. Regarding concerns of skiers and snowmobilers wanting continued winter access to the valley, Shell stated that it would be willing to discuss this matter with the appropriate authorities.

With respect to concerns regarding Waterton Park, Shell noted that the proposed location is approximately 5 km from the northwest corner of the Park. The location lies behind Sage Mountain so neither the drilling location nor access road would be visible from the Park, nor would the drilling operation be heard. Shell acknowledged that the location is within the zone of co-operation established by the Waterton Biosphere Reserve Management Committee, but noted that both the Committee and Parks Canada had recognized that no unacceptable negative impacts to the Park would likely occur if reasonable precautions were taken. Shell added that it would continue to meet with Park staff to avoid negative effects to the Park.

### Drilling Plan

With the Mississippian and Devonian formations as its objectives, Shell anticipated drilling to a depth of 5625 m. It proposes to drill a surface hole to a depth of 600 m with foam as the drilling fluid. Surface casing would be set and cemented full length. Based on offset well information, minor lost circulation is possible but no gas is expected.

Intermediate hole would then be drilled to the top of the Cretaceous formation using air as the drilling fluid, at which point the drilling fluid would be converted to a fresh-water mud system. Drilling would then continue through the Cretaceous to the top of the first Mississippian objective at 4440 m. A portion of this interval would be drilled directionally. Shell believes that lost circulation is possible in the Cretaceous, but notes that no sour gas zones are expected. At this point Shell proposes to set intermediate casing and cement it in accordance with Board requirements.

Shell then proposes to drill the main hole through the first Mississippian and, if it exists, the first Devonian objective to the top of the second Mississippian objective anticipated at 4750 m. Shell stated that if a full sheet or evidence of porosity or gas was encountered, casing would be set across this sheet. It expects normal pressures and minor or no lost circulation. Drilling would then continue through the second Mississippian into the second Devonian objective. Shell again anticipates normal pressures and minor or no lost circulation. Throughout the drilling of the intermediate and main hole, both barite and lost circulation material would be stockpiled on location.

Shell stated that the drilling of the well would take approximately 275 days, the last 83 days of which would be in the critical zone. Shell said that it anticipated spudding the well in November of 1986 which would result in drilling the critical zone during June through August of 1987.

In response to questions, Shell stated that production testing of the well would be performed through a packer and tubing arrangement rather than a conventional drill-stem test. Testing of a single zone could take up to 2 weeks, of which actual flaring would be 2 to 4 days. Shell suggested there could be two such tests on this well.

Shell noted that its proposed setting depth for intermediate casing is in excess of the Board's 3600-m requirements but considers this appropriate due to the expected competency of the rock at 4400 m. The design of the intermediate casing satisfies the Board's requirements for tension, burst, and collapse, and would be of grades suitable for sour service. In response to concerns of Diamond Hitch Outfitters regarding the adequacy of the casing design, Shell reiterated that it met Board design requirements for intermediate casing and may be appropriate for production depending on actual pressures encountered. Casing wear tests would be performed to determine the integrity of the intermediate casing prior to determining whether full length production casing or a liner would be used for production purposes.

Shell indicated that the depth of the proposed Jutland well would necessitate the use of relatively high strength drill pipe. It proposes to use a combination of X-95 and G-105 drill pipe. The X-95 pipe is softer and less susceptible to sulphide stress cracking than the S-135 drill pipe suggested in the Shell application. The X-95 pipe would be new pipe while the G-105 string would be Class II or almost new. Shell stated that in addition to other inspection methods, each joint of drill pipe would be hardness tested in accordance with Blowout Prevention Review Committee (BPRC) recommendations to eliminate unusually hard joints.

Shell proposes to use a Blowout Prevention (BOP) stack and choke manifold assembly rated to 34.5 megapascals and manufactured from materials conforming to the National Association of Corrosion Engineers (NACE) MR 01-75 standard for sour service suitability. The BOP stack is to be consistent with the recommendations of the BPRC and will consist of two pipe rams, one blind shear ram, an annular preventer, and two drilling spools. The pipe rams could be used to seal off the well with drill pipe in the hole, while the blind shear rams are designed to close an open hole or, if necessary, shear the drill pipe and completely seal the hole. Shell also proposes to have a ram blanking tool available to convert a pipe ram to a blind ram if required. Regarding the effectiveness of shear blind rams on higher strength pipe, Shell indicated that although they were aware that third-party testing on X-95 drill pipe had been conducted successfully, actual testing on the proposed X-95 string would be conducted prior to drilling.

The mud program proposed by Shell provides for a stockpile of basic zinc carbonate for $H_2S$ scavenging on location. However, Shell stated it did not intend to pre-treat the mud for the intermediate or main hole. Shell indicated that unless abnormal pressures were expected, it preferred to rely on the high pH of the drilling fluid for drill pipe protection and as the primary indicator of a sour gas influx. If a reduction in pH is experienced, it would treat the mud as necessary.

Shell indicated that the surface volume of mud available in the active system would be at least equal to the hole volume throughout the drilling of the main hole. In addition, a standby mud system would be used and would contain approximately 30 per cent of the anticipated hole volume. Mud system equipment would include two mud-gas separators, two independently powered mud pumps, and two hoppers with centrifugal pumps and associated transportation system to mix at least two sacks of weight or lost circulation material per minute.

Shell's proposal for kick detection and monitoring includes having a mud logger on location for gas detection purposes from the top of the Cretaceous. In addition, Shell stated that the drillers would monitor drilling parameters and the rig would be equipped with an electronic mud tank monitoring system and flowline sensors consistent with BPRC recommendations. Continuous pH monitoring and $H_2S$ ambient detection devices would be used while drilling through the critical zone. Shell does not propose to use third-party electronic monitoring.

Shell stated it would have excellent crew training and supervision on this well so that any dangerous situation would be detected early and treated before it becomes a well-control problem. Shell's Drilling Foremen would have Level II Well Control Certification, $H_2S$ Alert, and First Aid training. BOP checks would be conducted daily and BOP drills weekly. In addition, flow checks would be conducted while tripping and extra precaution would be exercised while tripping after a coring operation.

## Emergency Response Plan

Based on its geological interpretation of the region, Shell considers the proposed Jutland well to be an analog of the Waterton Sheet 4 zone. Accordingly, it used Waterton Sheet 4 data to estimate potential $H_2S$ release rates for emergency planning purposes. Shell considered Absolute Open Flow Potential (AOFP) data from the wells, Waterton 42 and Flathead 3, as representative of the highest flow rates experienced in their respective fields. The $H_2S$ concentration of 32.7 per cent over Waterton 41 was submitted as the highest in the Waterton Field. Shell estimated AOFP data for Jutland by extrapolating original reservoir pressures to the Jutland depths. Based on the worst-case Waterton data and assuming the upper sheet would be cased off in accordance with the drilling plan, a maximum $H_2S$ release rate of 13.3 cubic metres per second ($m^3/s$) was estimated.

Shell identified two areas or zones of importance with respect to its emergency response plan, these being the emergency planning zone and the emergency awareness zone.

The emergency awareness zone is an arbitrary area in which people would be made aware of drilling and emergency plans and would include Waterton Park, the closest residences to the east in Shell's Waterton

Field, and the area to the northeast of the drilling camp in the South Castle River Valley.

The emergency planning zone is the area closer to the well proposed for evacuation in the event of a well-control situation. It was determined based on a calculated maximum plume rise, under neutral atmospheric conditions using the Briggs Model, of 1000 feet above the well site. The emergency planning zone was determined as a trace of this topographical elevation. Shell considers this analysis to be extremely conservative for planning purposes.

In addition to these calculations, Shell employed Dr. D. Leahey as a consultant to use dispersion models to estimate the position of $H_2S$ isopleths under blowout conditions and local atmospheric conditions. Dr. Leahey's calculations for the $H_2S$ release rate of 13.3 $m^3/s$ resulted in 100 parts per million (ppm) and 20 ppm downwind isopleths of 2.3 and 11.0 km respectively. The 100 ppm isopleth and Shell's emergency planning zone are shown in Figure 3.

The ignition criteria proposed by Shell were that if $H_2S$ concentrations greater than 20 ppm are measured at the closest residence, or if Shell is unable to search and ensure the emergency planning zone is evacuated of transients, or well control is not achievable in the short term, the well would be ignited. Additionally, if concentrations reach 50 ppm in the downwind valley, the well would be ignited. Intentional ignition might also occur at sustained levels of 20 ppm in the valley, dependent on rig operations and crew safety.

Under questioning regarding its ignition criteria, Shell agreed that under a total blowout situation in which there is no method of gaining immediate control, the well should be ignited immediately unless it is assured that the emergency planning zone is evacuated and, in addition, monitoring is taking place off-lease in a downwind direction and no readings exceed 50 ppm. Shell stated that immediate control meant a period of 1 to 2 hours. Given the problems of assuring complete evacuation of the planning zone, Shell agreed that, in the case of total lost control, it was almost certain that the well would be ignited within 1 hour.

In the event of a partial blowout or leak, Shell stated that it would monitor the area and attempt to bring the well under control. If well control was not achievable in 1 or 2 days and 50 ppm were detected in the planning zone, the well would be ignited. Shell added that if long-term exposure were to occur, it would ignite the well if $H_2S$ concentrations of 20 ppm were measured in the planning zone. Regarding low concentrations due to a leak or partial blowout, and odour problems but no serious health risks in the Park, Shell indicated that ignition would be considered and would require discussion with Board, Forestry, and Park officials.

In response to concerns of interveners about the method of monitoring $H_2S$ concentrations in the valley, Shell stated that monitoring would be performed by personnel with Draeger units. Monitoring would begin at the well site and continue downwind at various points along the access road, then be continued upwind. Shell indicated that concentrations of 50 ppm very near to the lease would not necessarily result in ignition, but the well would be ignited if this concentration was detected 1 km or more from the well site. Responsibility for ignition under these circumstances would rest with the on-site supervisor. In response to concerns regarding the authority of a Drilling Foreman to proceed with the ignition of a drilling rig worth approximately 3 million dollars, Shell stated that it regularly places a lot of responsibility with these individuals and they are qualified to make this decision.

Shell identified three components to the implementation of its emergency response plan. The first would be the pre-plan stage in which, prior to drilling, it would review the plan with appropriate government agencies and finalize it. The Drilling Foreman would notify the Chief Park Warden of Waterton Park, the local Forest Ranger, local Fish and Wildlife Officer, local outfitters and trapper, Shell Waterton Complex Manager, and the owner of Castle Grazing Allotment #89 when drilling has commenced. The emergency response plan would be reviewed again prior to drilling out of the surface casing, and again prior to entering the critical zone. During the drilling of the critical zone, Shell proposes to supply all the aforementioned parties with weekly status reports of drilling progress.

As mentioned previously, Shell proposes to maintain a transient awareness program and it would equip the outfitters with radios for direct contact.

Shell stated that a Stage 1 alert would be initiated upon experiencing significant lost circulation, a kick situation, or continuous gas cut mud. This would result in helicopter surveillance of both the planning and awareness zones, assessment and precautionary evacuation of transients within the planning zone, and activation of monitoring stations at the rig camp, Red Rock Canyon gate, and the nearest residence to the east. In addition, Shell and government personnel would be mobilized, and the access road and trails would be blocked.

A Stage 2 alert would result from the well experiencing an uncontrolled flow or uncontrolled flow being imminent. Helicopter warning messages would be given every 5 minutes in both the planning and awareness zones. Alberta Forestry would be notified, the Emergency Task Force dispatched, and the well-control and emergency control centres activated.

### 4.2 Town of Pincher Creek

The Town of Pincher Creek supported the proposed Jutland well on the basis that the discovery of new reserves would support the local economy. The Town said the well would have minimal impact as it is located in a previously logged area and the access road is already in place, requiring only minor improvements. The Town also stated that restricting the use of the improved road during the drilling period would probably decrease the amount of traffic in the area.

### 4.3 Pincher Creek and District Chamber of Commerce

The Chamber of Commerce supported the proposed well on the basis that new reserves would provide an economic stimulus to the local economy. It noted the possibility of a severe economic setback in the event of a slow-down or shut-down of the plant due to declining reserves of the Waterton Field. It added that long-term operation of the plant has a significant impact on the local economy, and that it did not believe the proposed application would impair tourism in the area.

The Chamber of Commerce admitted that there could be some negative impacts associated with the proposed well, but stated that the area in question is not prime wilderness area, having been previously logged and with an access road for the most part already in place. It also suggested that the locked gate at Scarpe Creek should discourage the general public from intruding farther into the area.

### 4.4 Local 835—Energy and Chemical Workers Union

The Union, which represents the hourly-paid employees of the Waterton Gas Complex, supported the application, stating it would offer its members long-term job security if the proposed Jutland well was successful, or at least give an indication of their future in the industry if it was not. It noted that many of its members were also concerned that the area be preserved as closely as possible to present conditions, and it had no doubt that Shell would follow the guidelines and methods of operation presented at the hearing. The Union added that Shell standards and methods of operation are far more stringent than those set out in legislation. Given the stringent controls for drilling, camp location and operation, and use of the service road, it is satisfied that the area will retain its present recreational value.

### 4.5 Pincher Creek Snowmobile Club

The Snowmobile Club supported the application as long as reclamation and clean-up would be successful. The Club said that as Shell is in the oil and gas exploration business, Shell should be allowed to explore the Jutland area, knowing it would do the utmost to minimize impacts. The Club does not consider the proposed well to be detrimental to summer or winter recreationalists under the imposed stringent requirements. It added that logging or natural causes such as fire or beetle-kill have resulted in more unsightly situations, and that the proposed well site would result in a minimal disturbance of timber and wildlife cover.

The Club was concerned that plowing the access road during the winter would make snowmobiling in this area more difficult and hoped that some alternative snowmobile access route into the valley could be established. It was also concerned that the use of the locked gate could close part of the area to all but a few exclusive individuals. It stated that everyone is entitled to use the backcountry, and that the gate should not be located any farther north than the proposed Scarpe Creek location.

With respect to safety concerns, the Club said Shell has been extremely careful with gas leaks or blowouts, and it expects Shell would uphold safety standards.

### 4.6 Diamond Hitch Outfitters

Diamond Hitch Outfitters intervened as a local trail riding operation in the South Castle Valley. Mr. and Mrs. Judd indicated that they had been involved in trail riding or hunting expeditions in the area for 18 years, and have held a commercial trail riding permit since 1980 when such permits were first issued. They opposed the well based on a number of concerns.

Diamond Hitch questioned the need for the well given the current processing situation at the Waterton Gas Complex and the current gas market surplus. It stated that the application should be denied until a need is shown for reserves to sustain the plant, because to allow this amount of disruption for an exploratory well would be inappropriate.

Diamond Hitch presented Dr. B. Horejsi as a witness on the potential impact of the operations on the grizzly bear. Dr. Horejsi indicated that the grizzly is a large-ranging animal with adult males having home ranges of up to 1000 km$^2$. As a result, no single jurisdiction is likely to contain a population solely within its boundaries. Due to the grizzly's slow maturation, no more than 2 per cent of reproducing females can be removed from a population without causing a decline in that population. Dr. Horejsi added that most bear mortalities are related to conflicts with man, the majority of which are related to access concerns. He stated that Shell's claim that there would be no impact on the grizzly bear from the proposed development is not substantiated and ignores a vast body of information indicating the opposite.

Dr. Horejsi indicated that the proposed upgrading of the road would be detrimental to the grizzly bears by providing increased access for hunting and poaching. He presented evidence of man-caused bear mortalities in the general South Castle area that indicated approximately 25 per cent of kills from 1982 to 1984 inclusive were by poaching.

Dr. Horejsi stated he knew of other areas that had tried locked or manned gates with no success, and could not cite an instance where road closure had been effective. He acknowledged that the proposed gate may prevent some seasonal or midwinter use of the area south of Scarpe Creek, but stated that this would not compensate for the increase in the use of the area up to that juncture. Regarding alternate gate locations, Dr. Horejsi did not believe conditions for the grizzly bear could be improved with road closure anywhere along the road. The potential impact of the proposed road would be to eliminate the grizzly bear as a resident population on provincial lands in Southwest Alberta, and to significantly impact grizzly bear populations in Waterton and the entire Northern Continental Divide Ecosystem.

Regarding the fisheries of the area, Mr. D. Mayhood, a biologist who appeared on behalf of Diamond Hitch, identified the South Castle drainage area as important rearing grounds for native cutthroat and bull trout. He stated that the population of native strains of these species in Alberta are declining due to a combination of fishing pressure and hybridization. Mr. Mayhood said that the South Castle area bull trout and possibly the cutthroat trout would be reduced to remnant populations due to increased angling and poaching pressure arising from increased access. Legal catch limits for bull trout have recently been reduced in the province, reflecting recent findings of population decline.

Mr. Mayhood also expressed concerns regarding siltation effects due to the proposed road construction, suggesting that eggs and larvae could be severely impacted by localized high sediment loads. He noted that Shell has not identified fish spawning and rearing areas in relation to construction activities.

Mr. Judd presented evidence regarding the potential impacts of the proposed well and access road on his trail riding operation. He stated that wildland is an essential part of his business as his clients come to see the country the way it has always been. He added that most come from urban centres and do not want to see a well site or other industrial development.

Mr. Judd stated that the rig would be visible from a few locations along his trails at distances of 1 to 5 km and was concerned that the rig noise and the sighting of it would detract from the wilderness experience of his clients. He added that Shell's rig camp would be visible from one of the horse trails he often uses. Mr. Judd noted that he currently uses a portion of the road that would be rebuilt, and stated that although four-wheel drives occasionally use this portion, it is essentially a single-horse trail.

Mr. Judd expressed concern with the improved access to the area, particularly with respect to potential impingement on his base camp located about 10 km down the South Castle road. He indicated that although the base camp is less than 1 km from the existing road, he is not bothered by present motorized use.

Mr. Judd admitted that the drilling of this proposed well was not his main concern, but rather it was the potential for future developments. Mr. Judd stated that although he understands Shell has every intention of reclaiming the area and believes they can do it, if a producing well is drilled the access will remain greatly increased and result in a detriment to his business.

Diamond Hitch expressed a number of concerns regarding Shell's proposed drilling plan. In particular, it questioned the adequacy of the intermediate casing design with regard to its potential for use as a production string. It noted that the casing burst calculations of the intermediate string is based on the setting depth and suggested that it would be more prudent to design the casing based on the projected total depth of the well. In addition, it questioned the ability of the upper sections of intermediate casing to withstand bottom-hole pressures.

Similarly, Diamond Hitch was concerned about numerous aspects of Shell's emergency response plan. It questioned the reliability of Dr. Leahey's $H_2S$ dispersion and isopleth calculations, particularly with respect to $H_2S$ release rates. It suggested there would be a possibility of the proposed well encountering reservoir rock similar to Waterton Sheet 3 which, by nature of its fractures, would result in higher flow rates than the Waterton Sheet 4 on which Shell based its release rates. Diamond Hitch contended that Shell must have regard for Waterton Sheet 3 data in its emergency planning. It also questioned the atmospheric conditions on which Dr. Leahey's calculations were based.

Diamond Hitch also expressed concerns regarding Shell's ignition criteria, particularly with respect to the method of monitoring the valley for the 50 ppm concentration for ignition. It suggested that the lack of defined locations for monitoring within the valley was too subjective, and identified a need for clearer definition of ignition criteria and the responsibility of Shell personnel to order such ignition.

Regarding evacuation measures, Diamond Hitch questioned the ability of Shell to ensure evacuation or rescue of transients under various light and weather conditions.

### 4.7 Alberta Wilderness Association

The Alberta Wilderness Association is a public interest environmental group with a long-standing interest in the South Castle area. The AWA opposed the well on the basis of a number of issues.

The AWA stated that there is a lack of justification for the proposed well in the socioeconomic sense and that benefits to the public of rejecting the application outweigh those of approving it. The AWA contends that an economic assessment should be done to provide an indication of the magnitude of economic and social benefits which would be lost to the public through loss of recreational and tourism values if the well were to be approved. It stated that there is a definite need for wildlands but no shortage of sour gas for the available markets, adding that Shell has other opportunities for drilling outside the South Castle watershed.

The AWA stated that the proposed activities would have unacceptable detrimental impacts on ungulate, grizzly bear, and bull trout populations of the area. The proposed well and access road would result in wildlife removal due to hunting and poaching as well as avoidance of prime habitat.

With respect to bull trout populations, the AWA believes the proposed access road would result in siltation of breeding grounds and increased fishing pressure, noting that this species is particularly susceptible to over-fishing and that provincial objectives are to increase native bull trout populations.

It also expressed concerns regarding potential impacts on rare vegetation species in the area, particularly the Big Sagebrush community. The AWA was further concerned about the potential spread of noxious weeds such as knapweed due to the disturbance of the natural habitat.

The AWA was particularly concerned about the proximity of the well to the Waterton Park, both from the standpoint of wildlife using both the Park and the South Castle area, and also from the standpoint of the Park itself. It claimed that there is an increasing responsibility to recognize and protect the environmental integrity of the Waterton-Glacier International Peace Park. It added that the Waterton portion was declared a Biosphere Reserve in 1979 and the International Peace Park has been jointly nominated by Canada and the United States as a World Heritage Site. The AWA noted that the proposed well lies within the zone of co-operation for the Biosphere Reserve.

In view of the environmental sensitivity of the area and the potential detrimental impacts of the proposed well and access road, the AWA stated that an environmental impact assessment must be submitted before deciding the application. It added that the potential impacts of the proposed well cannot be adequately addressed if consideration is not given to the cumulative effects of future developments.

With regard to measures to mitigate environmental impacts of the proposed well and access road, the AWA believes that those proposed by Shell are inadequate. Specifically regarding the grizzly bear, Dr. C. Jonkel appeared on behalf of the AWA and stated there is insufficient data to determine proper mitigative steps because a regional impact assessment was not performed based on local data. He added that mitigative measures cannot be determined from extrapolated data such as that from the Flathead Valley, and that an assessment of all cumulative impacts would be required to properly determine the impact of the proposal on the grizzly bear of the South Castle Valley.

Dr. Jonkel noted that the grizzly bears are most sensitive to disturbances immediately after leaving their dens in the months of May and June, and also during late September when they are seeking and preparing their dens. He suggested that associated activity should be avoided or at least be very minimal during these periods. He further suggested that more emphasis be put on improving cover along the road and support of research efforts in adjacent areas. Additionally, Dr. Jonkel suggested a real effort be made to close adjacent areas to human use if the proposed development proceeds, for example, by improving road management, closing campgrounds, and cancelling livestock grazing permits. He said that training of employees in the area of bear awareness would be critical.

Regarding the impacts on wildlife in general, the AWA agreed that closing the road farther north than Scarpe Creek would be a significant benefit to reducing access. However, it added that the road itself would change the character of the valley and therefore the location of the gate is only one of the issues. In response to questions suggesting a shift in the time of year that the drilling operations could take place, the AWA stated that this would be very difficult because different species would be least affected at different times of the year. From a human perspective, however, the AWA agreed that shifting the period of drilling the critical zone away from the summer months would be advisable.

The AWA suggested that a fast-track environmental impact assessment in the form of a co-operative arrangement between appropriate parties could be performed. This type of assessment would be at the field level such that rare species could be identified and avoided, or in the case of vegetation, transplanted during the construction phase. Additionally, the AWA suggested that revegetation with native species and the use of fertilizers would promote rapid reclamation. It also suggested that periodic site inspection by trained personnel and monitoring of environmental indicators such as water quality could ensure that mitigative measures are successful.

Ms. E. Dunn, representing the AWA as an expert in recreational research, presented the results of a 1985 survey of users of the South Castle area. The survey indicated that the major recreational activities in the area are fishing, day-hiking, camping, and general nature appreciation, the majority of which is done on foot. Of the people surveyed, the average time period during which the people had used the South Castle area was about 12 years, and their recreational experience has deteriorated over the years due to over-use and motorized recreation. Ms. Dunn stated that 71 per cent of the users of the area indicated that the lack of industrial activity was important to them in their recreational experience.

The AWA had numerous concerns respecting emergency response planning for the proposed well, noting that the plan has not yet been finalized and was unacceptable in its present form. It requested that the plan be finalized with the appropriate agencies and be made available for review by the Board and the public prior to a decision on the application. It stated that reliance upon mechanical evacuation by helicopter or all-terrain vehicle was deficient in rough terrain, adverse weather conditions, and darkness. The AWA expressed concerns about the lack of ground access or exits from the area. It questioned the effectiveness of Shell's proposal for distribution of signs and informational pamphlets to backcountry users, stating that the wilderness user is not mentally prepared to deal with these circumstances. The AWA further questioned the adequacy of Shell's crew training in the case of medical emergency. It suggested Shell incorporate information in its emergency response plan on the specific resources available from agencies such as the trained rescue crews in both the Waterton Park and Kananaskis Provincial Park.

## 4.8 Timbermountain Packtrain

Timbermountain Packtrain is a family-operated commercial outfitting business which has operated in the South Castle/Waterton areas for over 30 years. It offers summer trail rides to groups in the South Castle area in proximity to the proposed well and road development. It has a base camp located at the junction of Scarpe Creek and the Castle River, close to the applicant's proposed rig camp and gate.

Timbermountain Packtrain said it had not been convinced that there is a need for this exploratory well, and noted that the drilling of the well would have an adverse effect upon its business regardless of its outcome. It did not specifically oppose the proposed road development but noted that a governing body is needed to ensure proper reclamation, and legislation is needed to ensure that public access is controlled either by sign or controlled gate. This legislation would alleviate some of its concerns regarding road access control.

Mr. Simpson said he opposed the application on the basis that the proposed well and road development would have negative effects on his trail riding operation. Encroachment of resource development into the South Castle area would have a detrimental effect on one of the few remaining natural wilderness areas of Southern Alberta. Timbermountain Packtrain noted it offers its customers a wilderness experience and that this would be affected by any commercial or industrial activities in the area. It also noted that the marketing of summer trail riding as a wilderness experience is highly competitive with other outfitting businesses in Alberta and the United States, some being closer to populated centres. It is the effectiveness of marketing that attracts possible customers, and the concept of a wilderness experience is essential to interesting these groups.

## 4.9 Mr. G. Hoffman

Mr. Hoffman is a registered trapper in the South Castle area and operates his trapline during the months of October through April. He is also authorized to locate a trapper's cabin in that area. The cabin is located in close proximity to the access road and the unplowed access road is used in trapping activities in the winter.

Mr. Hoffman's main concern was that the proposed plan to snow-plow the road during the winter months would increase traffic into the area and create a possible problem of vandalism to his cabin and traplines. He noted that it would be impractical to use snow machines on the plowed road and alternate routes would have to be found. Mr. Hoffman also noted that a road closure at Beaver Mines Lake would limit access to the area in which his cabin and traplines are located.

Mr. Hoffman expressed a belief that trapping opportunities around the well site would drop considerably during drilling operations and possibly for up to 2 years after drilling. He expressed further concern that some ungulates winter in this area during periods of high snowfall and the plowed road through this area could increase poaching and native subsistence hunting activities.

## 4.10 Pincher Creek Area Environmental Association

The Pincher Creek Area Environmental Association is a public interest group with the objectives of heightening the awareness of the public, industry, and government as to the social, environmental, and health impacts that natural gas processing and energy-related industries have and will have on the people living in the Pincher Creek area.

It was concerned with the purpose of the proposed well and questioned whether it would extend the total operating life of the Waterton Gas Plant or enable it to operate more efficiently. It also questioned the applicant's future plans for subsequent drilling operations in the South Castle area and the most likely pipeline route from the proposed Jutland location to the Waterton plant.

The Association was concerned with the dispersion of sour gases in the event of an uncontrolled flow, and questioned whether the applicant had done studies on wind, weather, and terrain to evaluate the most likely dispersion routes for sour gases. It noted that extreme conditions, if not adequately considered, could alter any studies done. These studies would be critical when considering escape routes for company personnel and the general public. The Association also discussed the effectiveness of the proposed monitoring system and questioned whether a back-up system would be available. Its final concern was related to whose responsibility it would be to rescue cattle from grazing allotments in the event of an uncontrolled flow. It questioned whether a performance bond could be offered by the applicant to provide compensation in the event of an accident.

The Association noted that the proposed well would have a long-term effect on its members and their livelihoods, and that its members are accustomed to enjoying the South Castle/Pincher Creek natural recreation areas in comparative safety.

## 4.11 Parks Canada

Parks Canada was concerned with the possible negative influences of the proposed well and access road on several wildlife species in the South Castle River Valley, particularly the grizzly bear and bighorn sheep. It noted that grizzly bears survive best in wild lands where man's presence is minimal. Given the evidence of poaching in this area, there is cause for concern. It also noted that very little is known about the importance of this area as bear habitat.

Parks Canada suggested that the applicant should have training objectives in bear awareness for on-site personnel. It requested the inclusion of a non-interference qualification on any drilling permit for the proposed well. That is, if a conflict developed between any personnel and bears in the area, the applicant should cease further operations until the bear or bears had vacated the area. It also requested that strict controls be established on the handling of human food supplies, garbage, and industrial wastes.

Parks Canada also noted that helicopter use could cause panic fleeing of wildlife. It said that the road closure restrictions would be the most important factor in minimizing any potential environmental impacts and endorsed the applicant's plans to reduce access with a gate.

Parks Canada was also concerned with production test flaring, specifically flaring products, concentration levels, and monitoring. It asked if test flaring could be prohibited during the high visitor period in the park.

Parks Canada noted that construction scheduling should minimize possible conflicts with wildlife and recreationalists, and indicated that the preferred construction period would be late November through to mid-April. It suggested a committee should be formed to monitor the construction of the proposed developments to ensure compliance with environmental protection specifications. It also recommended that the critical zone not be drilled between mid-June to mid-September, Waterton Park's high visitor season.

Parks Canada said the joint nomination by Canada and the United States of Waterton Lakes National Park and Glacier National Park as a World Heritage Site might be negatively influenced by the proximity of industrial activity. Those who visit Waterton are seeking an undeveloped natural area with minimum evidence of man's presence Occurrence of industrial noise or odours resulting from natural gas or industrial sources would interfere with that objective. Parks Canada noted that state-of-the-art technology must be used and offered its experience in avoiding or minimizing the negative influences of odours, noise, or the intrusive visual presence of industrial activity.

Parks Canada stated it did not endorse the applicant's Emergency Awareness Plan as presented at the hearing, but would endeavour to work with Shell to develop a suitable plan. It expressed concerns regarding procedures related to Waterton Park, and the feasibility of registering visitors to and from areas of the Park and erecting warning signs. The use of signs and the image they would create in a National Park was not favoured. It noted that the use of helicopters in the response plan would frequently be unsuitable because of weather conditions and the mountainous terrain. The only other way of advising transients would be by horseback, which is inefficient and not feasible given personnel constraints.

Parks Canada stated that the Shell evidence was unable to convince it that $H_2S$ concentrations of 20 ppm would not occur in the Park. It requested the Board to ensure that, if the application was approved, the drilling schedule, emergency response plan, and flaring plan reflect this concern. Providing all its concerns could be addressed and if an accidental discharge does not occur, Parks Canada concluded this single well "would not have an unacceptably negative impact" on Waterton Park. It added, however, that at the present time it did not see any safeguard or guarantee for the Park, its visitors, and its natural resources.

Parks Canada expressed some concern regarding the health and safety effects of different levels of $H_2S$ concentration, and requested guidance from the Board in this matter.

### 4.12 Waterton Biosphere Reserve Management Committee

The Waterton Biosphere Reserve Management Committee has as its goal to encourage the integration of use, development, and conservation of natural resources through programs of public information and education and through environmental research and monitoring. It promotes public awareness of resource management concerns facing the residents of the Waterton area. It is comprised of five ranchers and two residents of the Pincher Creek-Waterton area and two staff members of Waterton Lakes National Park.

The Committee was concerned about developments in the zone of co-operation, which comprises land adjacent to Waterton Park. It was not opposed to the application per se, but was concerned about the effects of the proposal on the environment. It believed that this single well and associated development could be put in place and drilling done "without a major environmental impact on the South Castle area", but added it has no confidence that there is a monitoring and review mechanism to ensure that this will take place. It suggested that a complete environmental impact assessment should have been done. It requested that the access road be evaluated from an environmental viewpoint to determine if relocation is advisable. It also noted that it should be the responsibility of a legal authority to control use and ban off-road motorized travel.

The Committee proposed a monitoring program be established by the applicant to monitor all resources which could be at risk; namely, water and air quality, soil chemistry, abundance and movement of ungulates and bears, and human use. It also recommended that a technical committee of various provincial and federal representatives be established to recommend mitigative measures which would be provided to the applicant.

### 4.13 National and Provincial Parks Association of Canada

The National and Provincial Parks Association of Canada identified itself as a voluntary national conservation group with a long-standing interest in the South Castle and Waterton Lakes area from a conservation and recreational perspective. It opposed the application and questioned the need for the well, stating that Shell has numerous other leases that could satisfy resource requirements.

The NPPAC stated that the presence of a well and access road will effectively reduce the available habitat for numerous wildlife species. The loss of habitat, the NPPAC contended, would likely be insignificant compared to increased access to the area that could result from the proposal. Specifically, the NPPAC was concerned about the effect on grizzly bear populations, stating that exploration would have a negative influence due to increased road access and associated hunting, both legal and illegal. It added that the wide ranging, low population density, and low reproduction rate nature of the bear indicates that man-caused mortality in the South Castle area would also affect population levels in the Park and adjacent lands.

The NPPAC also suggested that the proposed development would have a negative impact on habitat and recovery of wolf population. It stated that an environmental impact assessment would be necessary to evaluate impacts of the proposal in light of its significance on the ecosystem as a whole.

The NPPAC believes the proposed development would significantly reduce the attraction of the South Castle and Waterton areas for tourists and backcountry users. Although it stressed its prime recommendation was for denial of the application, it suggested a number of mitigative measures for both environmental and safety reasons. These included airlifting the rig to the proposed well site and completing an environmental study after the well is drilled to determine its impacts. It further suggested that signs be posted in all backcountry areas and brochures be distributed to all Park visitors to give information and warning to all Park visitors.

With respect to the emergency response plan, the NPPAC stated it appeared incomplete and poses a threat to the Park in a manner that is totally unacceptable.

### 4.14 Sierra Club, Western Canada Chapter

The Western Canada Chapter of the Sierra Club intervened as a group concerned about the enjoyment and preservation of wilderness areas. The Club took the position that the well licence should not be granted, and was generally supportive of the AWA position. It held the view that the proposed well and access road offered strong potential for increased impact on the remaining grizzly bear population. The Sierra Club suggested that long-term studies should be conducted to determine more precisely the long-term incremental environmental effects of full-scale development of the area, should it occur. Following this, it proposed a co-operative process among Shell, the public, and Government to determine the acceptability of these impacts. It was also concerned that industrial development may jeopardize the chances of the Park being designated a World Heritage Site by UNESCO.

If the well were to be approved, the Sierra Club stated that the gate on the access road should be located as close as possible to the beginning of the road and that the gate should be manned 24 hours per day to ensure restricted access to the area. In regard to the construction of the access road, it suggested that this be done in consultation with appropriate Fish and Wildlife officials to ensure minimal disturbance to the fisheries resource.

The Sierra Club stated that there were many deficiencies in Shell's emergency response plan, particularly regarding the possibility of wind coming from different directions, the possibility of the road being unusable during a blowout, and the fact that Shell had not said anything about notifying potentially affected people in British Columbia.

### 4.15 Sierra Club, Montana Chapter

The Montana Chapter of the Sierra Club opposed the proposed well, stating that the existence of this type of human activity is prejudicial to wildlife values, especially the non-disturbed habitat essential to grizzly bears. It also believes the proposed well would be prejudicial to the nomination of Waterton and Glacier National Parks as a World Heritage Site, and that the area of the proposed well site should be a buffer zone for the Park. The Montana Sierra Club stated that it supports all measures that will permit survival of a sustainable grizzly bear population, and that the bear requires large areas where human-bear encounters are kept to a minimum and in which human development is likewise minimized.

### 4.16 Mr. L. Kreck

Mr. Kreck, who presented the views of the Montana Chapter of the Sierra Club, also opposed the application on his own behalf as a private concerned citizen. He stated that the access road and consequent mechanical operation is one more downgrading disturbance influencing the survival of the already stressed grizzly bear and wolf populations. He said that the surrounding areas of world biosphere, the Waterton and Glacier National Parks, would be affected by any ambient air contamination or water degradation. He also stated that an environmental impact assessment is the best way to evaluate this proposal, adding that attempting mitigating measures never makes up for the initial and permanent damage to the prime resource.

### 4.17 Mr. R. Bailey

Mr. Bailey stated that his interest in the land was for recreational potential for international tourism through trail development for a variety of recreational activities. Although he did not specifically oppose the well, he was concerned that the integrity and guidelines of the Castle River Sub-Regional Integrated Resource Plan be upheld. The Plan permits natural gas exploration only under special conditions and controls to ensure preservation of the extensive recreational opportunities for the area.

Mr. Bailey admitted that some of his concerns regarding reclamation of the area were answered by Shell's evidence, but that assurance this reclamation would be successful was not given. He added a concern regarding the effectiveness of Shell's communication system in the terrain of the South Castle area in the event of a blowout.

### 4.18 Lethbridge Fish and Game Association/ Southern Alberta Environmental Group

The Lethbridge Fish and Game Association has approximately 1400 members in and around the Lethbridge region and is affiliated with the Alberta Fish and Game Association. The Southern Alberta Environmental Group is a relatively new organization with small membership. In a joint submission, they opposed the application on the basis that approving the well would result in no environmental or ecological benefit.

They stated that increased human activity would lead to more grizzly bear-human conflicts which would be a detriment to grizzly bear populations. The bear is running out of habitat, and the proposed access road would reduce it further. They stated that the access road would have a negative impact on sheep populations as a result of an increase in both poaching and legal hunting. A loss of critical summer elk range due to avoidance of the access road was also a concern.

With respect to the fisheries of the area, they believed there would be a negative impact due to siltation from road construction, increased fishing pressure, and potential for toxic materials associated with drilling fluids entering the watercourse.

They further considered the drilling of the well to have a serious potential for intrusion on the integrity of the Park, particularly in light of Waterton-Glacier National Parks' designation as a biosphere reserve and nomination as a World Heritage Site. It was the opinion of these two groups that an environmental impact assessment should be conducted.

They stated that many of their concerns were addressed by Shell's proposal to restrict access to the area, but they were not convinced that access could be properly controlled. They still had some reservations about details for mitigation and emergency response planning, and stated that they would oppose the application even with appropriate mitigation measures.

### 4.19 Mr. D. Sheppard

Mr. Sheppard appeared as a private citizen and stated that the proposed well should be rejected due to a high potential for environmental impact. He believed that development would cause a further loss of the unique natural environment and native biota in a part of the province already disrupted by industrial activity. Mr. Sheppard stated that the area contained a number of rare or unusual animals, insects, and plants, including a rare stand of Big Sagebrush. He believed the proposal would lead to increased hunting pressure as a result of easier access, and a loss of habitat for rare species such as the grizzly bear. With respect to the grizzly, he added the proposal would result in increased human contact and poaching.

Failing rejection of the proposal, Mr. Sheppard called for an adequate environmental impact assessment of the area. Failing this, he made a number of suggestions with respect to mitigative measures that could be taken to lessen environmental impact. While generally supportive of Shell's mitigative proposals, Mr. Sheppard suggested that the locked gate would be better located farther to the north near Grizzly Creek to close access to the general public. He further suggested that a botanical survey should be performed to ensure no rare species lie in the path of road construction, and the nesting sites of any rare or unique birds should be identified. More studies should be performed on grizzly bear, mountain goat, and bighorn sheep populations and movement.

Regarding the use of helicopters, Mr. Sheppard suggested that they should be avoided except in case of emergency. Mr. Sheppard was concerned that the proposed well and access road would result in a direct loss of natural environment to hikers, trail riders, and others. He believed there would be an additional loss of recreational value to users of the Waterton Park from pollution, noise, aircraft, dust, and visual impact.

Mr. Sheppard was also concerned about potential health hazards and effects in the event of a blowout. He questioned the information presented by Shell regarding the effects of various concentrations of $H_2S$ exposure.

### 4.20 Mr. E. Wolf and Family

Mr. Wolf appeared on behalf of his family as recreational users of the area, and opposed the proposed well. He questioned the necessity of the proposed location, suggesting the reserves could be drained from an alternate location.

Mr. Wolf said he considers the proposal to be an invasion of scenic and sensitive areas of the mountains and foothills by industrial incursion. He said few areas of the high mountain valleys against the B.C. border have not been invaded by oil industry activity and open access roads have resulted in habitat loss and reduction in populations of many species of fish, birds, and mammals. He was concerned about a lack of restoration and reclamation of lease roads and well sites, adding that old drilling sumps can attract wildlife. Mr. Wolf also stated that, given this proposal, the Waterton Park and environs seem unlikely to qualify as a World Heritage Site.

Mr. Wolf said Shell should not have abbreviated its study of environmental impact in the area. Regarding mitigative measures, he suggested that a helicopter to transport the rig and crew has been used in other situations, and would serve to reduce construction.

Mr. Wolf questioned the setting depth of the surface casing proposed by Shell, and suggested that lost circulation could be a problem. He also had doubts about Shell's perceived low risk of a blowout and the calculations of $H_2S$ concentrations. He was also concerned about the hazards of $H_2S$ and sulphur dioxide ($SO_2$) exposure to lung tissue in the event of a blowout.

### 4.21 Montana Wilderness Association

The Flathead Chapter of the Montana Wilderness Association stated that it is interested in the preservation of the Northern Continental Divide Ecosystem of which Alberta wild lands are a key component. It opposed approval of the well prior to an environmental impact assessment and cumulative impact study being performed. It suggested that such an assessment would ensure that the Northern Continental Divide Ecosystem and particularly the Waterton-Glacier complex is protected from unsound development. Piecemeal development surrounding the ecosystem will endanger the unique resources of wilderness and wildlife in this area.

The Montana Wilderness Association stated that making the area more accessible would be detrimental to wildlife both through poaching and displacement in an area where other niches are not available. It further stated that the detailed drilling procedures and contingency plans stress the seriousness of the $H_2S$ problem. Citing the Lodgepole blowout as a case of

Alberta hurting itself and its neighbours, it suggested that the effects on the Waterton Park of a Jutland blowout could be far more intense.

### 4.22 Other Interventions

Seven other parties filed written submissions to the Board but did not present them at the hearing. These parties have been identified in Table 1. In general, all seven parties opposed the application for environmental reasons based mainly on the potential disturbances of flora and fauna communities due to the proposed access road and associated construction.

The Glacier-Two Medicine Alliance was present for cross-examination of Shell, and expressed concerns about reclamation of the access road and the type of vegetation used for reclamation. The Alliance also raised questions about the movements of grizzly bears and wolves between the Flathead and South Castle areas.

## 5 VIEWS OF THE BOARD

### 5.1 Justification or Need for the Well

The Board has considered the evidence presented at the hearing regarding the justification or need for the proposed Jutland well. It notes that Shell has obtained the appropriate petroleum and natural gas lease and mineral surface leases for construction of the drilling site and access road. Shell has interpreted seismic data to indicate the potential presence of gas reserves and the Board heard no evidence to suggest the contrary. It notes Shell's commitment not to drill the proposed well if the Grouse well fails to encounter Paleozoic rock, as that would raise serious doubts about its seismic interpretation of the region. In the Board's view, this emphasizes Shell's contention that the well is solely for exploration purposes.

Several of the interveners suggested that there is no reason to drill the proposed well due to a surplus of gas in Alberta. Notwithstanding the current surplus, the Board recognizes that natural gas is a valuable resource and that over the long term the potential additional reserves of natural gas would represent benefits not only to Shell, but to the Alberta public interest. It therefore believes that it is important to have continued exploration for natural gas.

The Board notes the request of the AWA for an analysis of social and economic costs and benefits of the proposed well compared to the impacts of possible recreational and tourism losses. The Board believes that, given the exploratory nature of the well and the uncertainties associated with such development, the suggested analysis is not necessary.

With respect to suggestions that an alternative location for the well could be found, the Board accepts Shell's geological evidence that the downhole location is strategically located to obtain the maximum information from a single well.

Given that Shell was granted a lease to explore in the subject area and that seismic information suggests that natural gas may underlie the area in volumes worth hundreds of millions of dollars, the Board believes there is sufficient justification for the proposed Jutland well. However, that justification must not override the ability to explore for the resource in a manner which is acceptable in terms of public safety or other impacts on the public or the environment. The Board will therefore evaluate these matters in subsequent sections of the report.

### 5.2 Potential Impact on the Environment and Mitigative Measures

This and the following sections of the report deal only with impacts resulting from normal operations. The impacts of a possible blowout are dealt with in Section 5.7. The impact on the environment of the possible drilling of the well at the proposed site relates to construction of the drilling and drilling waste disposal sites and access road, subsequent drilling of the well, the end use of the road, and all activity associated with those tasks.

The term "environment" as used in this report, refers to wildlife as well as vegetation, soil, and water. The impact on the environment will be reviewed over the proposed 1-year construction and drilling phase as well as some reasonable time into the future. Since the well would be exploratory in nature, two possible future scenarios must be perceived in order to adequately deal with mitigative measures. The well would be either successful and left suspended for a certain period of time or the well would be abandoned.

### 5.2.1 Wildlife

At the hearing, the primary focus on wildlife was with respect to the grizzly bear, although other wildlife species were identified and did receive considerable attention. Concerns for all wildlife fell into three categories:

- loss of habitat leading to possible mortality,
- interruption of normal movements to or from the proposed construction and drilling areas, and
- increased mortality due to greater human access to the area.

Insofar as loss of habitat is concerned, the Board recognizes that the existence of levelled drilling and waste disposal sites, the camp, and the improved road would reduce the range available for wildlife. The Board believes, however, that the reduction would be relatively minor, particularly having in mind the present existence of a large, partially-cleared area and the limited access road, and the fact that the proposal relates only to a drilling operation for a single well. Similarly, the Board does not expect that the disruption of normal movements by wildlife through the area resulting from the drilling of this one well would have a substantial negative impact on the various species.

Both of these impacts, on habitat and movements, would be reduced by Shell's undertakings to prohibit workers' vehicles in the area, use whistles on vehicles that must be there, fence the waste disposal site, bridge the Castle River to avoid siltation problems, and minimize helicopter flights over the area. The Board accepts these undertakings and, if the proposed well is approved and drilled, would urge Shell to do everything practical to minimize the extent of traffic and the level of noise that would be associated with the operation.

Turning to the question of potential impacts on wildlife as a result of increased access to the area, the Board agrees with most participants in the hearing that this would represent the major threat to wildlife from the proposal. The Board notes that Shell would take the following mitigative steps if its application were approved:

- A locked gate would be installed at the Scarpe Creek junction and manned during the drilling activities.
- Firearms and use of motorized recreational vehicles by staff would be prohibited.
- Combustible garbage would be incinerated at the campsite and non-combustibles would be transported out of the area.
- Grizzly bears in the immediate vicinity of the camp or operations would be removed, if necessary, and not be killed.

The Board is satisfied that the latter three items mentioned above would very effectively reduce the possibility of increased mortality of wildlife, particularly grizzly bears, as a "direct" result of activities by Shell or its employees. In this regard, the Board believes the suggestion by Parks Canada to give bear-awareness training sessions to Shell staff is worthwhile, and should be seriously considered by Shell to further minimize the possibility of direct impacts on wildlife mortality.

In the Board's view, the "indirect" threat to wildlife mortality from Shell's proposal is of greater concern. This could result from increased hunting and poaching and other possible kills by persons who are not Shell employees that will have improved access to the area. The Board notes Shell's admission that lack of proper access control could result in significant long-term impact on the grizzly bear population. It also notes the belief of Diamond Hitch Outfitters and some other interveners that road closure anywhere along the South Castle River Valley would not improve the situation for the grizzly or other wildlife. In the Board's view, the gate closure at the Scarpe Creek junction would help to minimize the threat to wildlife mortality south of this point, but would do little to minimize impacts north of the junction.

The Board sees a paradox with respect to this matter. If the well proceeds, Shell would very likely be able to control any direct mortalities. However, Shell is very limited in what it can do to control the indirect mortalities that could result from the improved access it would, of necessity, provide to the area. These indirect mortalities could occur because others, many of whom would be members of the Alberta public, would either exercise legal rights to hunt or break the law by poaching. To some extent, a denial of the Shell application due to these potential impacts would be to penalize Shell and the broad Alberta public, who could benefit from increased resource exploration, for something over which Shell has little control. The Board believes the better approach would be to restrict the likelihood of excess mortalities to wildlife through appropriate hunting and fishing restrictions and increased surveillance.

The Board notes that, contrary to Diamond Hitch Outfitters and some other interveners, a number of interveners including the AWA suggested a gate closure farther to the north would improve the situation for wildlife. Additionally, some interveners believed that for any road closure to be effective, some form of legislation would be required and would need to be rigidly enforced. The Board does not consider itself to have the jurisdiction to direct a closure farther to the north, and indeed, because the hearing was not advertised to consider such a possibility, questions whether it has heard from all of the groups that might be impacted by such a step. For this reason, the Board is not recommending any action in this respect but will make the appropriate government department aware of the comments made at the hearing. If the well is approved and proceeds, the Board suggests that Shell further discuss the question of the location of a gate closure with government officials.

The Board also notes that the possibility of airlifting the rig and associated equipment to the well site by helicopter to remove access concerns was raised at the hearing. The Board believes that such an operation would be impractical. It also notes the view expressed by Parks Canada that "...it would be a much greater disturbance even if it was physically possible to fly a rig in like that...than the road access would cause.".

There was some discussion at the hearing of possible impacts on wildlife which could result from limited production testing of the proposed well. The duration of such testing would be very limited and would be subject to a host of regulations and approvals of the details by the Board. The Board is satisfied that if the well were approved and proceeded, any testing that would be necessary could be conducted in such a manner as to have virtually no long-term impact on wildlife.

After the proposed 1-year construction and drilling phases, the impact on wildlife would depend on whether the well was successful and left suspended for a certain period or whether it was abandoned. In either case, the Board believes that Shell's proposal for reclamation of the well site, the drilling waste disposal site, and drilling campsite would adequately reduce the impact on wildlife with respect to loss of habitat or disrupted movements. The two scenarios, however, warrant comment with respect to impact on wildlife due to improved access.

If the well proceeds and is abandoned, Shell indicated that the road south of Scarpe Creek would be returned to its original state. Measures to reduce access would include transplanting large trees at the entrance to Scarpe Creek. Shell also stated that maintenance such as grading and snow-plowing would be discontinued from the access closure at Scarpe Creek to the junction of Highway 774. These two features would, in the Board's view, go a long way to restoring the area to its current state.

In the case where the well was left suspended for a certain period of time, Shell indicated that the road would remain gated and locked at the Scarpe Creek entrance. Also, additional mechanical barriers would be installed at the gate and along the road and consideration would be given to placement of large boulders at strategic points. Maintenance of the road surface from Scarpe Creek to the junction of Highway 774 would cease when Shell is not active in the area. If the well were suspended, the temporary bridge would also be removed.

As indicated previously, this Board does not consider itself to have jurisdiction over road closure or maintenance. However, the subject of access to the area if the well proceeds, is successful, and is suspended, was a major concern at the hearing. The Board is of the view that if this scenario unfolds, it would not be appropriate to snow-plow the road from Scarpe Creek to the junction of Highway 774 during the winter months. Any monitoring of the well during winter could be done by other modes of transportation. With such an approach, during any period of well suspension, winter access to the area would be little different than is now the case.

In summary, with respect to possible impacts on wildlife of the Shell proposal to drill the Jutland well, the Board recognizes that impacts would occur but does not believe that they are so serious as to cause denial of the application. The most significant threat to wildlife would result from potential increased mortalities due to improved public access to the area. With stringent control by Shell of its activities and those of its employees, and appropriate actions by government officials to limit access and control poaching and other illegal activities, the Board believes the problem of increased mortality of wildlife would not be serious.

### 5.2.2 Vegetation, Soil, and Water Quality

The Board recognizes that construction of the drilling and waste disposal sites has potential for impact on vegetation and soil, especially since these activities require a certain amount of levelling and removal of topsoil and existing vegetation. Of particular concern at the hearing was the Big Sagebrush community that exists between the road and the river on the southwest slopes of Whistler Mountain. Some questions were also raised on the type of revegetation to be used during reclamation.

The Board is generally satisfied that the method of construction proposed by Shell would minimize any permanent impact on the environment. The Board recognizes suggestions of the Waterton Biosphere Reserve Management Committee and other interveners that a technical committee be established for evaluating the appropriateness of the road location, monitoring construction activities, and recommending mitigative measures. The Board acknowledges that this type of committee might be useful for major developments but believes this approach is not warranted for a single exploratory well. A more practical approach to minimizing impacts related to construction activities would be through on-site inspections and consultation by appropriate government officials as construction progresses. This was suggested by a number of participants at the hearing and in the Board's view, would be particularly beneficial for identifying rare plant and animal species in the path of construction, and also to minimize siltation effects on fish-bearing habitat. If the Board approves the application, it would have discussions with the appropriate government departments to consider the need for special government inspections and increased attendance during construction.

Once drilling commences, any improper waste management of drilling fluids, sewage, or garbage could have impact on the environment. The Board is satisfied that the proposed measures dealing with these concerns have been adequately addressed by Shell. Also, the Board has in place very stringent regulations on waste management and would ensure that Board staff regularly inspect the facility to ensure that those requirements are met.

## 5.3 Potential Impacts on Commercial Users

The Board has given careful consideration to the potential impacts of the proposed well and access road on the two commercial outfitters in the South Castle Valley. The outfitters expressed concerns regarding potential impacts due to improved access into the area and more frequent contacts with members of the public. The Board recognizes these and believes that an effective road closure at Scarpe Creek could help to mitigate the problem.

The Board is aware that a portion of the riding trail presently used by the outfitters would become access road and that public and rig traffic could detract from trail riding operations. The potential impact would be reduced by Shell's undertaking to minimize both ground and helicopter traffic between the camp and well site. It should also be noted that some motorized recreational traffic already frequents the area.

The Board has also considered the concerns of Mr. Judd regarding potential impingement on his base camp, and Mr. Simpson's concerns regarding the proximity of Shell's proposed campsite to his base camp at Scarpe Creek. It notes the outfitters' evidence that they hold miscellaneous surface leases for their base camps, and Shell's evidence that it holds a similar lease for the southerly portion of the proposed access road. Although the Board considers itself to have jurisdiction to assess the potential impacts of Shell's proposed campsite on the outfitters' base camps, it does not believe it has jurisdiction to direct that the location of Shell's proposed access road or campsite be changed. In assessing those potential impacts, the Board, having heard no detailed evidence regarding this matter, is not satisfied that they are such as to warrant denial of the application. Rather, the Board suggests that, if the application is approved, consultation among the outfitters, Shell, and the appropriate government department could result in arrangements to mitigate negative impacts.

Both outfitters contended that the presence of Shell's proposed drilling operations would detract from the wilderness experiences they market. In that regard, the Board notes Mr. Judd's evidence that the drilling rig would be visible from only a few trail locations within 1 to 5 km distance, and that visual contact would be of short duration.

In terms of impact on the outfitters beyond the drilling stage, Mr. Judd indicated there would be virtually no impact if the well were abandoned. The Board agrees this would be the case, and indeed, it does not believe that there would be a substantial negative impact on the outfitters because of the existence of a suspended well in the area. This conclusion assumes that Shell would properly carry out the reclamation and measures to restrict access which are described in an earlier section of the report.

Regarding the trapping operations of Mr. Hoffman, the Board notes Shell's commitment to meet and resolve his concerns regarding winter access to the area. With respect to Mr. Hoffman's comments that road closure at the Beaver Mines junction would help to limit access in the area of his cabin and traplines, the Board believes that this could indeed reduce the potential for vandalism. However, as previously stated, the Board does not consider itself to have the jurisdiction to direct such a road closure, but would make the appropriate government department aware of the comments made at the hearing should the application be approved.

The Board recognizes that there is potential for alteration of animal movement patterns such that Mr. Hoffman may experience a reduction in trapping harvest of some furbearers in areas near the campsite, well site, or access road. In that regard the Board understands that Trapper's Compensation could be available to offset the impact of Shell's operations on Mr. Hoffman's trapping activities.

In summary with respect to commercial users of the area, the Board recognizes that there would be some impacts on their operations primarily limited to the period of construction and drilling of the proposed well. The Board has no evidence before it as to the magnitude of the potential impacts measured in monetary terms. In its judgement, this magnitude would not outweigh the potential value to society of the exploratory well proposed by Shell. Moreover, the Board notes that the commercial trail riding permits held by the outfitters and the trapping certificate held by Mr. Hoffman do not give them a right to exclusive possession of the areas described in their permits. It further notes that the Government's zoning of the area allows for natural gas exploration under special conditions and controls. Given these considerations, the Board would not see potential impacts on these parties as justification for denial of the Shell application. Nevertheless, the Board believes every reasonable effort should be made by Shell to minimize any impacts that would result. If a well licence is granted, the Board would ask Shell to have on-going discussions with commercial users of the area towards this objective.

## 5.4 Potential Impacts on Recreational Users

The Board is well aware of the recreational potential of the South Castle area as identified by both the

Integrated Resources Plan and many of the interveners. It is also aware that the Plan allows natural gas exploration under special conditions. Its consideration of the potential impacts on recreational users must take into account both of these facts.

The Board recognizes that for those people who currently visit the area, the existence of an upgraded road, camp and drill sites, and the drilling operations would have an impact by detracting from the "wilderness experience". In the Board's judgement, these will not be overwhelming impacts in that there will be many parts of the general area where the disturbances will be neither seen nor heard. Also, the disturbances resulting from drilling operations would be only for about 1 year, after which removal of the rig and camp and reclamation activities would reduce impacts to negligible levels.

The improved access to the area also has potential for impacts on recreational users. On the one hand, the increased traffic could detract from the area for those who now frequent it and wish essentially total solitude. On the other hand, the improved road has the potential for encouraging more people to use the area. If there was an expectation of greatly increased numbers in the area, these opposing impacts would probably equate to an overall negative impact.

However, with the planned activities towards minimizing public access, such as the closure at Scarpe Creek and the prohibition of Shell workers having vehicles at the campsite, the Board does not see the area being overrun with visitors. Consequently it does not see this potential impact as a serious problem.

Regarding the potential impact of the proposal on the recreational value of Waterton Lakes National Park, the Board believes this to be minimal. It recognizes evidence of Shell that the proposed well site is behind Sage Mountain such that it would not be visible from the Park. The Board also considers the approximate 5-km separation between the well site and the Park boundary to be more than adequate to negate concerns regarding noise and normal odour problems.

With respect to concerns of interveners suggesting the proposed well prejudices the Park's nomination as a World Heritage Site, the Board is aware that numerous sour gas wells already exist closer to the Park boundary. Additionally, according to the Integrated Resource Plan, access restrictions associated with natural gas development in the General Recreation Zone are designed to provide a buffer to the integrity of the Park. The Board also notes that both Parks Canada and the Waterton Biosphere Reserve Management Committee considered the impact of the proposed well on the Park could be held to acceptable levels if adequate precautions could be ensured.

The question of possible impacts on the Park of a blowout are discussed in Section 5.7 of the report.

All things considered, the Board does not believe the drilling of the single exploratory well as proposed by Shell or the related construction activities would have serious and irreversible impacts on casual recreational users of the area. It therefore would not deny the application because of these concerns.

## 5.5 Precautions to Prevent a Blowout

The chances of a blowout in any drilling well are very small. However, since the proposed well would be a critical sour well, the Board would require extra precautions to prevent a blowout. These would relate to the personnel, equipment, and procedures used in drilling the well.

The Board reviewed Shell's proposed casing design and considers the design and setting depth of the surface casing to be adequate. Regarding the intermediate casing string, the Board considers the design to be appropriate both in terms of its design for tension, collapse, and burst criteria and also with respect to sour service design criteria. The Board agrees that Shell's proposal to set the intermediate casing at 4400 m, although in excess of the Board's normal 3600-m requirements, would be appropriate given Shell's geological prognosis. However, the Board would expect that, should the well be drilled, the casing setting depth would be determined in light of actual occurrence of formation tops.

The Board notes the concerns of Diamond Hitch Outfitters regarding the intermediate casing design and its adequacy for use as a production string. Shell proposes to determine the integrity of the intermediate casing by caliper logging or pressure testing prior to deciding on running a liner or full-length casing for production purposes. The Board is satisfied with Shell's plan to run these tests, and notes that the results of these tests would be required as a part of a separate application to the Board for production casing design.

The Board reviewed Shell's intention of drilling the proposed well with a drill string comprised of new X-95 and Class II G-105 drill pipe. It considers the components appropriate for use given the depth of the well and the potential $H_2S$ concentration. It further believes that Shell's proposal for hardness testing and other inspection procedures are necessary to ensure safe drilling operations.

The Board notes that the pressure rating of the BOP stack conforms to Board regulations, and considers it adequate for drilling the proposed well. It believes that Shell must, as proposed, ensure that all components of the BOP system are tested to ensure the adequacy for sour service. It further believes that the shear blind rams proposed must be tested on the X-95 pipe to be used.

The Board acknowledges Shell's proposal not to pretreat the drilling mud with $H_2S$ scavengers, but rather to rely on the pH of the drilling fluid as the prime indicator of $H_2S$ in the mud system. Given Shell's intent of installing continuous pH monitoring equipment, the Board is satisfied that pretreatment of the mud is not necessary. However, the Board would require, as proposed by Shell, that an adequate supply of $H_2S$ scavenging material be stockpiled on location.

In reviewing the kick detection system proposed, the Board believes that the degree of monitoring is inadequate for an exploratory critical sour well. It has considered the need for continuous electronic monitoring of drilling and drilling fluid parameters to enable personnel to recognize potential problems at the earliest opportunity. Given the critical nature of this well, the Board believes this type of additional monitoring is warranted. If the well is licensed, the Board would therefore require the use of continuous electronic monitoring of the more significant drilling and drilling fluid parameters during the drilling of the critical zone.

The Board is generally satisfied with Shell's proposed mud mixing and conditioning equipment. It is also satisfied that an active* mud system at surface equal to 100 per cent of the hole volume would be adequate. It recognizes that, given an adequate water supply available at the well site for immediate addition to the system, this volume, plus the approximately 30 per cent excess in the standby system, would be adequate for controlling most lost circulation situations. The Board understands that Shell proposes to drill a water well at the well site for its water requirements while drilling. The Board would require that, prior to commencement of drilling, Shell satisfy it that there is a water supply capable of providing sufficient water volumes to be used in potential lost circulation situations.

The Board believes that one of the most effective precautions to avoid a blowout is the use of careful drilling procedures. In this regard, the Board is satisfied with the proposed qualifications of Shell's Drilling Foreman and its intention to conduct regular BOP drills and equipment checks. The Board stresses the importance of these inspections to ensure that personnel are qualified to handle well control situations and that equipment is fully operable, and believes that ERCB staff could assist in this regard. As a result of the Lodgepole Phase 2 report, Board staff conduct a minimum of three inspections on all critical wells during which the staff ensures that all drilling equipment is functioning properly and that proper drilling and kick-control procedures are being followed. If a well licence is issued, the Board would ask its field staff to be present when the intermediate casing is drilled out and to conduct at least three comprehensive inspections during the estimated 83-day period in which the critical zone would be open.

The Board, if it licenses the well, would require that Shell, while in the critical zone, report weekly by telephone to an ERCB area office, or more frequently if requested to do so, to report any problems encountered, confirm the performance of daily inspections, facilitate effective scheduling of ERCB inspections, and identify upcoming operations. The Board would also require Shell to notify the ERCB area office immediately by the quickest effective means of any unusual drilling problems such as lost circulation, a kick, or the persistent presence of sour gas in the drilling mud. Given the potential $H_2S$ release rate from this well, the Board believes this increased involvement of its staff would be warranted.

In summary regarding the precautions to be taken to prevent a blowout, the Board is satisfied that those proposed by Shell, subject to the modifications mentioned earlier, are fully adequate for the proposed well. Those precautions, coupled with Shell's record as a capable, careful operator, very experienced with sour gas, satisfy the Board that the proposed well could be drilled with only a very small chance of a blowout occurring. Notwithstanding this, the Board recognizes that one can never be absolutely certain a blowout would not occur, and accordingly, it will review the actions that would be taken and the possible impacts of a blowout in the following sections of the report.

### 5.6 Actions in the Event of a Blowout

Actions planned in the event of a blowout would be documented in Shell's emergency response plan. The Board's draft Interim Directive ID 84-   defines a critical well and lists as a requirement that a satisfactory emergency response plan must be filed with the Board prior to spudding the well. The Board, in this section, will review Shell's emergency response planning as set out in the application and at the hearing, giving consideration to the concerns expressed by interveners.

The Board notes that many of the interveners, particularly the AWA, questioned the effectiveness of Shell's transient awareness program and its ability to conduct a consistent and adequate program of $H_2S$

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* The Board considers the volume of the active system to be the volume of mud ordinarily capable of being circulated and therefore excludes those tank volumes rendered inactive due to the location of inlet and outlet piping in the mud tanks.

monitoring in the valley in the event of a sour gas release. It further notes concerns regarding the ability to ensure complete evacuation of Shell's proposed emergency planning zone in all weather and light conditions. The Board also recognizes the concerns of Parks Canada regarding Shell's proposed registration program and the drilling of the critical zone during a period of peak Park use.

The Board agrees with many of the interveners that it would be virtually impossible for Shell to be aware of all people who may, at any one time, be within the emergency planning zone. The Board further believes that Shell could experience severe difficulty in evacuation procedures, particularly at night and during bad weather, even if it were possible to know the exact location of all transients. For these reasons the Board would, if it licensed the well, require more stringent ignition criteria than those proposed by Shell. Ignition would convert the released $H_2S$ to $SO_2$ and, due to the heat of the fire and resulting thermal rise, disperse it over a much greater area. This would also remove the need for training in specialized evacuation procedures as suggested by the AWA.

An evacuation and ignition policy for sour wells has been under consideration by the Board for some time. A draft policy is now being circulated to industry, government agencies, and public interest groups for comments and suggestions. The policy is designed to protect the health and safety of people near sour gas operations. If a proposed well has a high potential for $H_2S$ release and is located in an area that makes evacuation impractical, the draft policy requires immediate ignition of a release of sour gas. Having regard for the location of the proposed Jutland well, the Board would make any licence granted subject to the condition that, in the event of a complete loss of control of the well and a release of sour gas, it be ignited.

If there were only a leak or partial loss of control such that the presence of $H_2S$ was generally confined to the immediate vicinity of the lease, the condition of the licence would allow for the well not to be immediately ignited, but only with the approval of the Board. The Board would not give its approval unless it was satisfied that there was a high likelihood that control could be regained in a short period of time and that there was no threat to the health and well-being of the public.

Shell also indicated that in the event of any indication of a potential blowout, its planning would provide for early contact and continued communication with the commercial outfitters and officials of Waterton Park, the Town of Pincher Creek, and all involved government departments. Shell would quickly marshall the necessary resources to bring about control of the well and ensure safety of the public in the meantime.

The Board is satisfied, subject to the more stringent ignition requirement described earlier, that Shell's planned reaction to a blowout would be generally satisfactory. Further details would be evaluated when the emergency response plan has been finalized. In this regard, the Board would require that Shell provide an opportunity for input to the plan from all parties that could be involved, including government officials, public representatives, and public interest groups such as the AWA, before the plan is submitted to the Board in final form.

### 5.7 Potential Impacts of a Blowout

There was considerable discussion at the hearing regarding the $H_2S$ release rate as estimated by Shell and its appropriateness for emergency planning purposes. The Board acknowledges the uncertainties in these matters due to the exploratory nature of the well. It considers Shell's estimate of 13.3 $m^3/s$ to be reasonable given these uncertainties; however, the immediate ignition criteria as described in the previous section remove the necessity for detailed consideration of the potential $H_2S$ release rate. The impacts of a blowout will be evaluated on the basis of the immediate ignition requirement.

The impact from a sour well blowout can be divided into impact on human health and safety and impact on the environment such as wildlife, vegetation, soil, and water. The most significant impact relates to the release and subsequent dispersion of gas containing $H_2S$ or $SO_2$. Of course, the longer the duration of the well blowout, the more prolonged and potentially serious the impact.

The Board notes that a number of interveners raised concerns regarding the anticipated health effects of $H_2S$ and $SO_2$ at various concentrations. The Board generally relies on public health and safety organizations for information on these matters. Studies are on-going and a variety of guidelines exist. Given the numerous requests for information made during the hearing, the Board is publishing, as Appendix 1 to this decision report, a table entitled "Characteristics and Health Effects of $H_2S$ and $SO_2$". The appendix was compiled from those government documents cited therein.

Given the previously-described ignition criteria, if a total blowout occurred, the well would be immediately ignited. If it was not, this would be because the leak was small in nature. In either case, the volume of $H_2S$ released to the atmosphere would be small and would therefore impact only on a very limited area. Recognizing that blowouts are invariably preceded by some degree of problems at the well, the Board would require that Shell's emergency response plan include the search and evacuation of the immediate vicinity of the well at the outset of a problem. The region which could be threatened by the small $H_2S$ release would be so limited that it would probably not be much larger than the presently cleared area in which the well would be located. Therefore the evacuation of this area would not represent a serious problem in that any member of the public would likely be visible from the rig and in any case would be easily sought out. Additionally and as proposed by Shell, the commercial outfitters in the area would have radios and if they happened to be in the vicinity would be contacted and alerted at the first sign of a problem. The Board therefore concludes that the $H_2S$ which could be released, recognizing the ignition criteria, would not be a serious threat to public safety.

In the Board's view, the ignition criteria also remove concerns expressed regarding the potential impacts of $H_2S$ on cattle in nearby grazing allotments.

Insofar as the possible impact on wildlife of an initial brief release of $H_2S$ is concerned, the fact that only the immediate vicinity of the well would be affected, which wildlife tends to avoid in any case, would most likely avoid any mortalities. There could be a limited stress from the initial small volume of $H_2S$ on plant life, but again because of the short duration of the release, the Board does not believe that significant permanent damage would occur.

Having dealt with the possible impact of $H_2S$ if a blowout occurred, it is also necessary to assess the possible impacts of $SO_2$. This would be of less significance because the $SO_2$ which would result from the firing of the well would disperse over a greater area and concentrations at the ground surface would be relatively low. Some understanding of the potential impact resulting from a large release of $SO_2$ can be gained from the Lodgepole blowout. In that instance, very large volumes of $SO_2$, some 900 tonnes per day, were emitted over two separate periods, totalling 41 days, when the well was on fire. The maximum peak $SO_2$ reading on the basis of monitoring data taken during the periods was 0.275 ppm which occurred about 50 km from the well. This compares to a nuisance ground-level concentration standard of 0.17 ppm over a 1-hour interval and to a life threatening level of 1000 to 2000 ppm for continued exposure.

With this understanding of the dispersion behaviour of $SO_2$ as a background, the evidence of Dr. Leahey respecting its dispersion in the specific case being dealt with satisfies the Board that $SO_2$ released from the proposed well would not represent a threat to human safety in that ground-level concentrations would be very low. For the same reason, cattle would not be threatened nor would there be a significant amount of irreversible damage to the environment.

In the event of a blowout, whether ignited or not, there would be impacts in the immediate vicinity of the well due to activities to control the well. The Board believes these problems would be short-lived and reparable.

The Board recognizes that a well blowout and its ignition, even though the chances of one occurring would be small, would have a nuisance impact in that occasional $SO_2$ odours could occur at different times and at different locations over a large area. In this regard, the Board agrees with the position of Parks Canada that such a situation would be highly undesirable in Waterton Park during the peak tourist season. The Board is also aware that the peak tourist season is the time of year when the South Castle area itself is likely to have the greatest number of visitors. The nuisance impact of a well on fire and emitting $SO_2$, and of well control efforts, would thus be least desirable at this peak season.

For these reasons, the Board has reviewed the proposed drilling schedule that Shell put forward at the hearing. It notes that, if the well were approved, Shell would await the results of drilling at the Grouse well. If they were positive in nature, drilling at Jutland would commence in about November of 1986. The expected time of drilling of the critical zone would thus be June, July, and August of 1987. As indicated previously, these would be the least desirable months in the unlikely event that a problem were to occur. Accordingly the Board, if it issues a licence, would require that Shell schedule its operations so that it would not commence drilling in the critical zone prior to mid-September of 1987. This would mean that any problem situation which might occur would be after the peak tourist period in the region and the Park. An additional benefit would be that, in the case of an ignited blowout, the potential $SO_2$ effects on vegetation would be minimal since the growing season would be essentially past.

The Board has also given considerable thought to the concerns expressed by Parks Canada regarding the awareness program proposed by Shell. Parks Canada suggested that the distribution of brochures and posting of signs would create an uneasy feeling with visitors to the Park and questioned whether the benefits would be worth the negative impacts. The Board understands this concern, particularly having in mind the immediate ignition requirement which would remove any need to consider evacuations from the Park, and the further requirement which would move the drilling of the critical zone out of the peak tourist period. If the well is approved, the Board would ask Shell to have further discussions with Parks Canada and to follow whatever preference Parks Canada had in terms of an awareness program within the Park. Shell's proposed awareness program within the South Castle Valley would be appropriate, in the Board's view, because it is immediate to the proposed well site.

In summarizing its views respecting the possible impacts of a blowout, the Board first emphasizes that the most important objective must be to avoid a blowout. The Board is satisfied that Shell's plans would minimize the possibility of one occurring, but if it did occur, the immediate ignition criteria would be critical in terms of safeguarding public safety and minimizing environmental impacts. With such a requirement in place, the Board concludes that the impacts of a blowout, although potentially very significant, would not be disastrous.

## 6 FINDINGS OF THE BOARD

Having considered the evidence presented at the hearing, the Board finds as follows:

1. The lands for which the well and access road are proposed have been designated by the Castle River Integrated Resource Plan as General Recreation. This designation allows for petroleum and natural gas exploration subject to special controls and conditions, such as restricted access.
2. Shell has the right to explore the area by way of petroleum and natural gas leases, and the necessary surface leases for access road and well site construction.
3. Given the exploratory nature of the well and based on available seismic and geological interpretations, and recognizing the long-term benefits to Alberta of resource development, there is sufficient justification for drilling the proposed Jutland well, provided any risk to public safety and impacts on the environment are held to acceptable minimums.
4. The drilling of the Grouse well in British Columbia will provide a test of Shell's seismic interpretation, and the proposed Jutland well would not be drilled if the Grouse well fails to encounter a build-up of Paleozoic rocks.
5. Seasonal access to the South Castle area is presently possible to Scarpe Creek by conventional motor vehicle, and up to and beyond the proposed well site by four-wheel drive or all-terrain vehicle. Winter access to the South Castle Valley is prevented only by the accumulation of snow.
6. The proposed well site and drilling waste disposal site are located in areas previously disturbed and cleared by salvage logging. The proposed access road would follow existing access roads or trails. Construction activities would therefore result in minimal additional disturbance to the environment, and would minimize habitat loss and avoidance responses of wildlife.
7. The impacts of construction activities on the environment could be further minimized through on-site inspections and consultation with appropriate government agencies as construction activities progress. This would be particularly beneficial for identifying rare plant and animal species in the path of construction, and also to minimize siltation effects on fish-bearing habitat.
8. Shell's proposals for mitigating environmental impacts, such as minimizing road and helicopter travel, initially a portable bridge over the Castle River, prohibiting firearms and restricting leisure activities of personnel, and careful handling of waste and garbage, are well thought out and should be effective. Consideration should be given to training Shell personnel in bear awareness in an effort to reduce the potential for man-bear confrontations.
9. The major impacts on wildlife, and particularly the grizzly bear, would be the threat of increased mortality due to increased road access. Road closure by way of the locked and manned gate at Scarpe Creek would restrict access beyond this point during the drilling period. If the well proceeds, Shell and government officials should consider whether a closure farther to the north would be appropriate.
10. The threat of increased mortality to wildlife which would result from improved access to the area north of Scarpe Creek could possibly be reduced by appropriate hunting and fishing controls and increased surveillance and penalties for poaching.
11. If the well proceeded and was successful, any testing would be very limited in nature and should not have a significant long-term impact on wildlife or on the environment.
12. If the well proceeded and was abandoned, Shell's reclamation plans are such that no lasting impact on the environment would be likely. The closing off and reclamation of the access road south of Scarpe Creek and the cessation of maintenance on the road north of that point, would reduce the access to the area to much the same as exists today.
13. If the well proceeded and was suspended, Shell's reclamation plans to prevent access south of Scarpe Creek would be reasonably effective. In such circumstances, the road north of Scarpe Creek should probably not be maintained and there should be no snow removal in winter.

14. Shell's proposed drilling and construction activities, while in keeping with the integrated resource plan, may detract from the operations of the commercial outfitters. Shell's proposed mitigation and reclamation proposals will reduce potential impacts such that this one exploratory well should not have major negative impacts on the outfitters' activities. Potential impacts can be further minimized by close contact between Shell and the outfitters.

15. If the well proceeds, discussions with government officials should be sought in an effort to alleviate concerns of the outfitters regarding conflicts in base camp locations and impingement upon the base camps by the general public.

16. Winter road closure by way of a locked gate at the Beaver Mines junction would help to alleviate Mr. Hoffman's concerns regarding potential vandalism to his trapper cabin. This possibility should be considered by the appropriate government department.

17. Trapping activities could be affected to some degree during winter drilling operations both in terms of road travel and activities near the campsite and well site. If this is the case, Trapper's Compensation may be available.

18. There would be some short-term impacts on recreational users of the South Castle area resulting from the planned access road and the existence for 1 year of the camp and drill sites. Also the improved access would allow for more visitors to the area, which some users would see as a negative impact.

19. The well site and access road are of sufficient distance from the Waterton Park boundary that the proposal would not result in visual or other negative impacts on recreational users in the Park.

20. The casing design program proposed for the drilling of the well is adequate. Casing integrity tests as proposed by Shell would be required prior to approval of a final production casing program.

21. The drill string design consisting of X-95 and G-105 drill pipe is satisfactory given the well depth and potential $H_2S$ exposure. A comprehensive testing program for eliminating excessively hard joints, as proposed by Shell, would be very important.

22. The proposed BOP stack design is generally satisfactory subject to reviewing all components to ensure adequacy for sour service and testing of the shear blind rams on the grade of drill pipe to be used.

23. Shell's proposal not to pretreat the drilling mud with an $H_2S$ scavenger is satisfactory subject to Shell stockpiling an adequate supply of scavenging material at the drilling site for immediate addition to the mud system if necessary.

24. The exploratory nature of the well indicates that caution is required regarding formation pressures, flow rates and fluid compositions to be encountered. Therefore a need exists for Shell to conduct continuous electronic monitoring of key drilling and drilling fluid parameters to ensure that potential drilling problems are recognized at the earliest possible opportunity.

25. The mud system is essential in maintaining a suitable hydrostatic overbalance or controlling lost circulation problems. Shell's proposed equipment and excess capacity in its active surface volume are generally satisfactory. However, to be most effective an adequate water supply must be available prior to commencement of drilling.

26. Careful drilling procedures are vitally important to ensure against a blowout situation. The proposed qualifications of Shell's drilling personnel, and its intentions regarding BOP drills and equipment checks, are generally satisfactory. The Board field staff should play an active role in this regard because of the critical nature of the well.

27. Since the proposed well is located in a region frequented by backpackers and other recreational users, there is no way of knowing with certainty whether people would be in the area. Also, in periods of bad weather contacting such people could be extremely difficult. Accordingly, if a total blowout occurred at the well, it would have to be ignited as soon as the workers could be evacuated from the rig and it would be safe to do so.

28. If a leak or partial loss of control occurred at the well, it should be ignited unless it is clear that control of the well is imminent and there is no threat to public safety.

29. The emergency planning zone proposed by Shell is conservative particularly having in mind the ignition criteria that would apply if the well were licensed.

30. Shell has the experience and resources to deal with potential control problems at a sour well and its plan for doing so is generally satisfactory.

31. With the immediate ignition requirement, only small volumes of $H_2S$ would be released if a blowout occurred. This would not represent a serious threat to public safety or the environment.

32. The $SO_2$ which would be released in the case of an ignited blowout would disperse such that no significant impacts could be expected on human health or the environment.

33. If a blowout occurred and was ignited, although the $SO_2$ would not be a threat to public safety, there could be occasional odours at different locations at significant distances from the well. These could create some limited discomfort and would represent a nuisance.

34. If the application was approved and drilling proceeded in accordance with Shell's schedule, operations would be in the critical zone during June, July, and August when the tourist season in Waterton Park and the number of visitors to the South Castle Valley are at a peak. This would be undesirable given the possibility, however remote, of a blowout and the nuisance impact of $SO_2$. Drilling of the critical zone therefore should be delayed beyond this period.

## 7 DECISION

On the basis of the findings summarized in the preceding section of the report, the Board concludes that the proposal to drill the exploratory well, SHELL JUTLAND 14-3-3-2, has the potential for significant benefits to the Alberta public interest and could be drilled with minimal impacts on the environment and little threat to public safety or well-being. To accomplish the latter would require careful adherence by Shell to the construction, drilling, and emergency response plans described in the application and the many undertakings given at the hearing. Close surveillance of the operations by the Board and the appropriate government departments, and good communications with groups that use the area and with officials of Parks Canada, also have the potential to minimize the impacts.

The Board is therefore prepared to approve Shell's application and issue the requested well licence. It will make the licence subject to the following conditions:

- Details of the drilling plan, particularly those items referred to in the report as needing further consideration, must be approved by the Board prior to spudding of the well.

- Immediate ignition of the well shall take place if there is a total loss of control at the well. The only time at which a small leak could go unignited would be if the Board is satisfied that control of the well is imminent and there is no threat to public safety.

- Details of the emergency response plan must be approved by the Board prior to spudding of the well.

The licence is being issued on the understanding that the following arrangements will be adhered to:

- The Jutland well will not proceed until the drilling results of the Grouse well are known and generally support Shell's geological interpretation of the region.

- No construction in the South Castle or Font Creek area will occur prior to the decision to drill the Jutland well.

- Shell will give consideration to the suggestions of Parks Canada regarding a bear-awareness program.

- Discussions will take place between Shell and government officials respecting the appropriate location for gate closures.

- The details of any limited testing of the well would be approved by the Board prior to the commencement of testing.

- Discussions will take place between Shell and the commercial outfitters and trappers in the area in an effort to better recognize their concerns and to minimize impacts on them. These will include the possible conflict regarding the location of base camps and the potential impact on trapping operations and will, where appropriate, include discussions with the appropriate government department.

- Shell will, while in the critical zone, inform the appropriate Board field office of its operations on a weekly basis.

- Shell will advise the Board field office immediately, by the quickest effective means, of any unusual drilling problems or occurrences.

- Shell will provide an opportunity for input on the emergency response plan from representatives of the commercial outfitters, the Town of Pincher Creek, Parks Canada, and other potentially impacted parties prior to submitting it to the Board in final form for approval.

- Operations will not take place in the critical zone during the peak tourist season from 15 June to 15 September.

- Shell will discuss with Parks Canada the appropriate awareness program for visitors to Waterton Park.

Additionally, the Board plans to discuss this decision report with appropriate government departments, particularly regarding the following matters which the Board considers to be beyond its jurisdiction:

- The possibility of increased on-site surveillance by appropriate government officials during the construction phase in an effort to further minimize potential impacts on the environment.

- The appropriate hunting, fishing, and poaching controls for the area.

- The appropriate gate location for access restriction.
- The question of appropriate maintenance, including snow removal, for the access road north of Scarpe Creek if the well is completed and left suspended for some period of time.

DATED at Calgary, Alberta, on 3 June 1986.

ENERGY RESOURCES CONSERVATION BOARD

GJ DeSorcy

G. J. DeSorcy
Vice Chairman

L. A. Bellows
Board Member

E. J. Morin
Acting Board Member

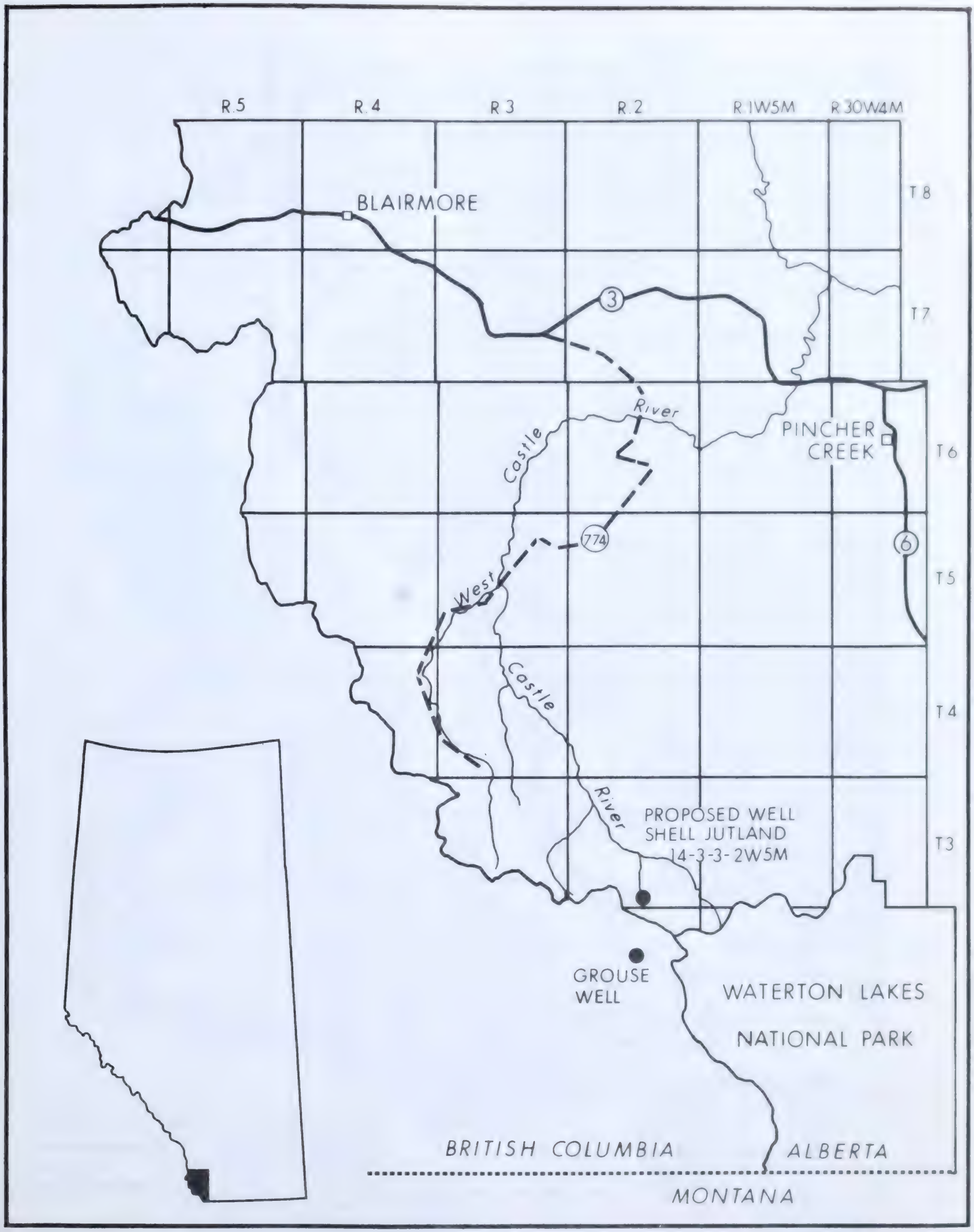

FIGURE 1–LOCATION OF THE PROPOSED JUTLAND WELL

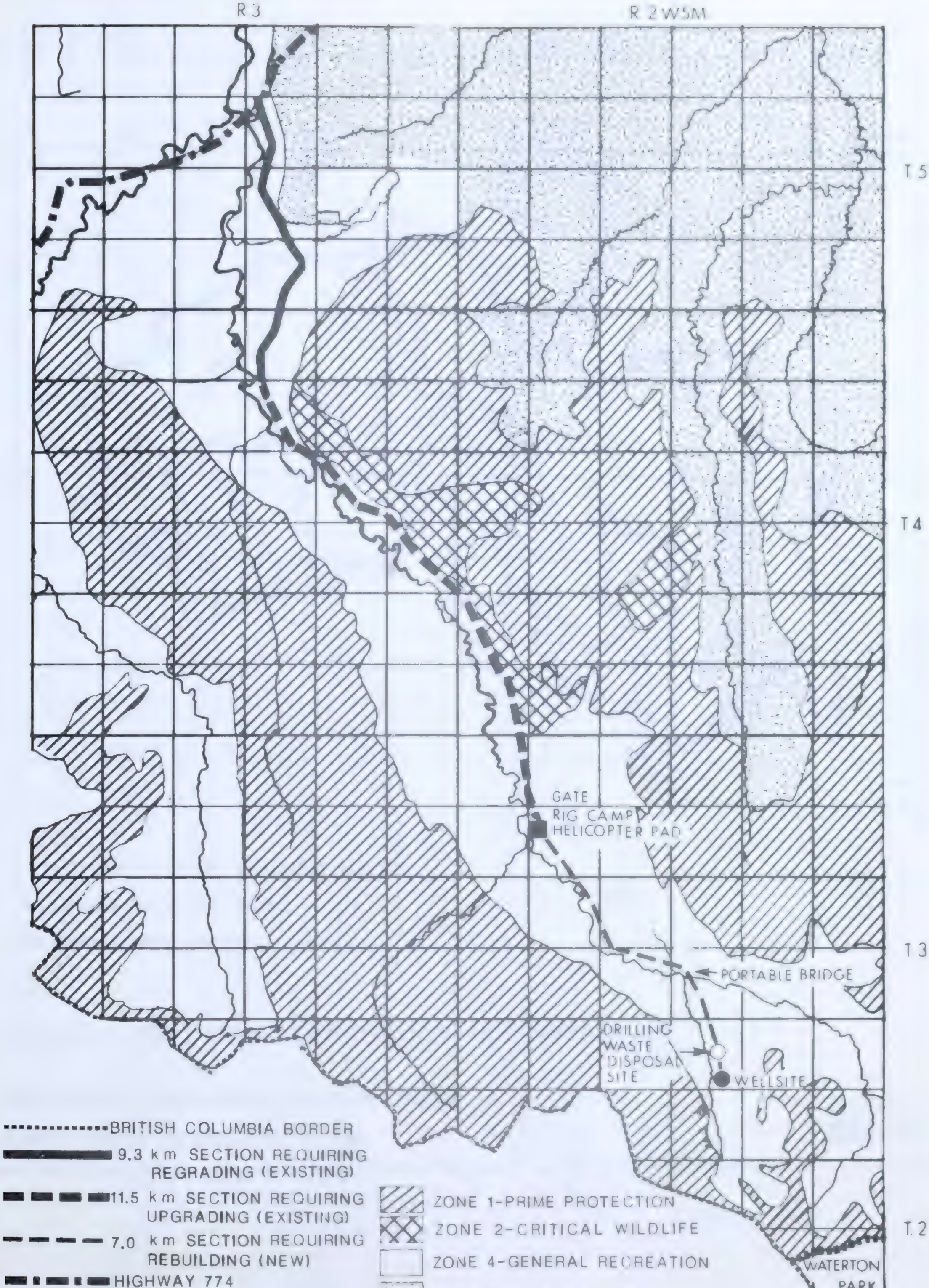
R 3
R 2 W5M
T 5
T 4
T 3
T 2
GATE
RIG CAMP
HELICOPTER PAD
PORTABLE BRIDGE
DRILLING WASTE DISPOSAL SITE
WELLSITE
WATERTON PARK
BRITISH COLUMBIA BORDER
9.3 km SECTION REQUIRING REGRADING (EXISTING)
11.5 km SECTION REQUIRING UPGRADING (EXISTING)
7.0 km SECTION REQUIRING REBUILDING (NEW)
HIGHWAY 774
ZONE 1-PRIME PROTECTION
ZONE 2-CRITICAL WILDLIFE
ZONE 4-GENERAL RECREATION
ZONE 5-MULTIPLE USE

FIGURE 2-LOCATION OF PROPOSED ACCESS ROAD AND CONSTRUCTION ACTIVITIES

D86-2

ERCB

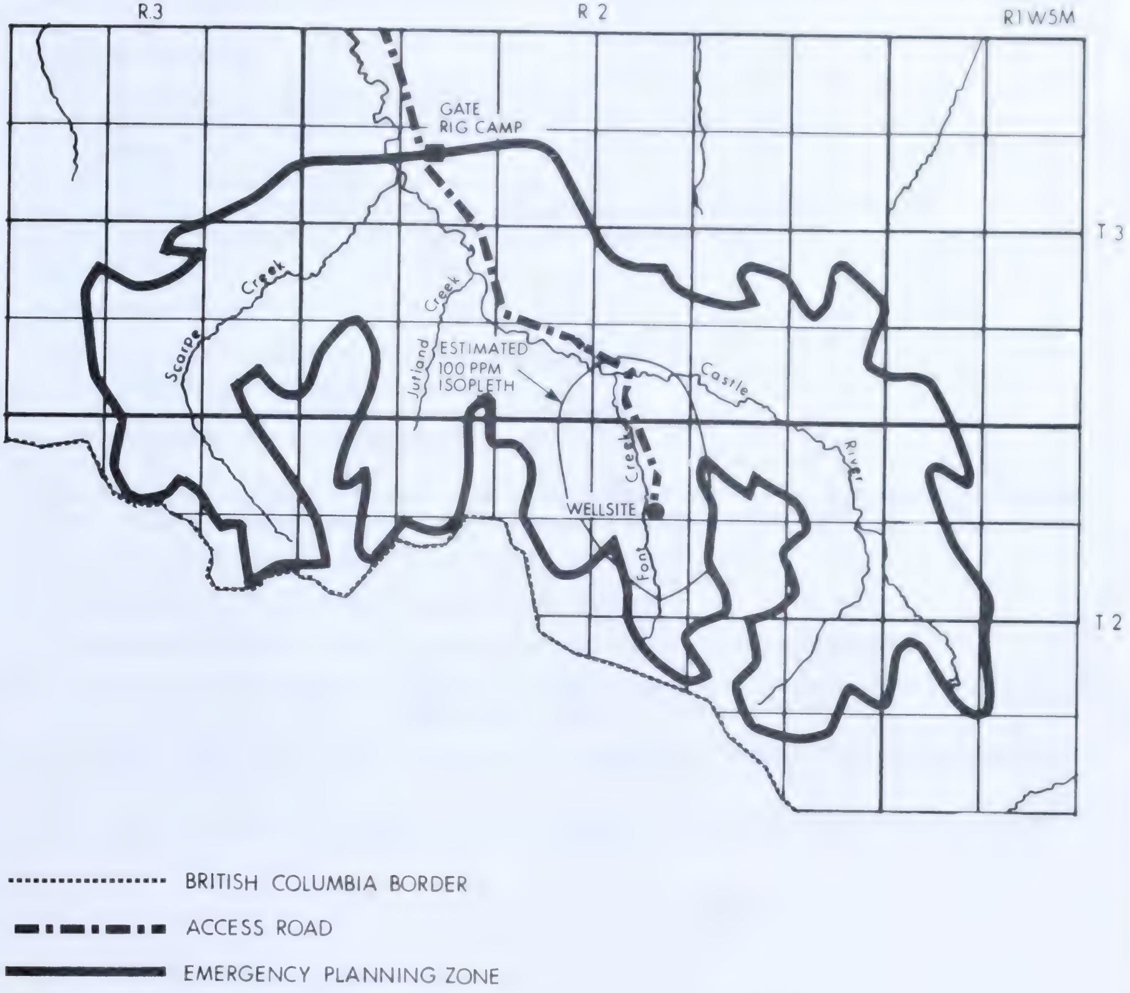

FIGURE-3 PROPOSED EMERGENCY PLANNING ZONE

ADOPTED FROM SHELL 14-3-3-2W5M
EMERGENCY RESPONSE PLAN

## APPENDIX 1—CHARACTERISTICS AND HEALTH EFFECTS OF $H_2S$ AND $SO_2$

### Characteristics of $H_2S$

- Found in rotten eggs, natural oil and gas, silos, sewers.
- Found as a gas at temperatures above -60°C.
- Colourless.
- Flammable—burns to form $SO_2$.
- Odour of rotten eggs at low concentrations—kills all sense of smell at higher concentrations.
- Will tend to disperse more slowly in sheltered or calm (eg low-lying) areas.
- Extremely toxic.

### Characteristics of $SO_2$

- Formed by the combustion of $H_2S$, and is non-flammable.
- Found as a gas at temperatures above -75°C.
- Has the odour that occurs when a match is extinguished.
- Highly irritating—dissolves to form sulphuric acid.

The following tables on health effects were adapted from this list of sources. Many of the standards are currently under review, particularly in terms of the exposure averaging times, and some of those cited have been generalized.

1. Canada Safety Council Data Sheet "Hydrogen Sulphide", No. B-3.
2. Canada Safety Council Data Sheet "Sulphur Dioxide", No. B-4.
3. Alberta Provincial Board of Health "Guidelines for Action Regarding Hydrogen Sulphide".
4. National Research Council of Canada, "Hydrogen Sulfide in the Atmospheric Environment: Scientific Criteria for Assessing its Effects on Environmental Quality", publication #18467.
5. Alberta Public Safety Services "Government of Alberta Emergency Response Plan for a Sour Gas Release", Second and Third Editions.
6. Occupational Health and Safety Act, Chemical Hazards Regulation, Government of the Province of Alberta.

**General Health Effects of $H_2S$* and Provincial Standards**

| CONCENTRATION (ppm) | HEALTH EFFECTS |
|---|---|
| 0.01 | 1-hour Clean Air Act—Air Quality Standard (for avoiding nuisance levels). |
| 0.01-0.3 | Odour threshold, minimum concentration one can smell. |
| 1 | Voluntary evacuation for sensitive individuals if levels persist and are averaged over a 1-hour period. |
| 1-5 | Moderate to strong offensive odour. May experience nausea, tearing of the eyes, headaches, or loss of sleep following prolonged exposure. Effects are reversible and not serious. |
| 5 | Voluntary evacuation for individuals without pre-existing health problems but who experience difficulty. Evacuation should normally occur only if levels persist and are averaged over several hours. |
| 10 | 8-hour Occupational Exposure Limit |
| 15 | 15-minute Occupational Exposure Limit |
| 20 | Ceiling Occupational Exposure Limit<br>Urgent evacuation will be advised if these concentrations are experienced for even a few minutes. |
| 20-50 | Can increase eye and lung irritation. May cause eye damage after several days of exposure. May cause digestive upset and loss of appetite. |
| 50-150 | Increased eye and lung irritation. |
| 150-300 | Kills sense of smell. Severe eye and lung irritation. |
| 300-500 | Dangerous, loss of smell within 30 minutes. |
| 500-700 | Serious damage to eyes within 30 minutes. Severe lung irritation. Life threatening—death within 4 to 8 hours. |
| 700-1000 | Breathing stops within one or two breaths. Life threatening—death within 30 minutes to 1 hour. |

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* See above references.

**General Health Effects of $SO_2$* and Provincial Standards**

| CONCENTRATION (ppm) | HEALTH EFFECTS |
|---|---|
| 0.17 | 1-hour Average Clean Air Act – Air Quality Standard (for avoiding vegetation damage). |
| 0.3 | Evacuation suggested if levels persist and averaged over a 24-hour period. |
| 1.0 | Evacuation suggested if levels persist and averaged over a 3-hour period. |
| 2 | 8-hour Average Occupational Exposure Limit. |
| 3-5 | Odour threshold. |
| 5 | 15-minute Average Occupational Exposure Limit. Evacuation recommended if these concentrations are experienced over several minutes. |
| 8-12 | Throat irritation, coughing, constriction in the chest, tearing and smarting of the eyes. |
| 10-50 | After 5-15 minutes exposure: increased irritation of the eyes, nose, throat, choking, coughing, and in some cases wheezing as a sign of narrowing of the airways (which increases the resistance of the airflow). |
| 150 | Short-term endurance due to severe eye irritation and because of the effects on the membranes of the nose, throat, and lungs. |
| 500 | Highly dangerous after an exposure of 30-60 minutes. |
| 1000-2000 | May be fatal with continued exposure. |

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* See above references.

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

# EXECUTIVE SUMMARY
# APPLICATION BY HEWITT OIL (ALBERTA) LTD. FOR APPROVAL OF A GAS PROCESSING PLANT GOLDEN SPIKE AREA

Decision D 86-3
Application 850583

The Energy Resources Conservation Board considered, at a public hearing in January 1986, an application by Hewitt Oil (Alberta) Ltd. for a small sour gas plant in the Golden Spike area.

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## THE DECISION

*The Board has decided to approve the application for the reasons set out in the main report and highlighted in this summary. Approval is also required from the Minister of the Environment with respect to environmental matters.*

Approval is subject to

- Hewitt will be limited to processing 112.7 thousand cubic metres of natural gas per day, although the approved maximum capacity of the plant is 225.4 thousand cubic metres per day. Should Hewitt wish, in the future, to increase the gas throughput to more than 112.7 thousand cubic metres, a new flare stack design, and a plan for twinning the processing equipment, will have to be submitted to, and approved by, the ERCB and Alberta Environment;

- Hewitt must provide 24-hour-a-day supervision at the plant for at least 3 months and thereafter until the Board has been satisfied that the plant can operate continuously and automatically and in a safe manner;

- Hewitt must not drill any water wells in the area.

## BACKGROUND AND APPLICATION

Hewitt's slightly sour natural gas was processed at the Esso Golden Spike plant from 1968 until September 1984, when Esso discontinued its gas sweetening operations. Hewitt was unable to negotiate an agreement to continue gas sweetening operations and consequently, in May 1985, Hewitt applied for a small sour gas processing facility.

The new plant will process the gas and recover the sulphur in slurry form. The plant will not emit sulphur dioxide to the atmosphere during normal plant operations.

## ISSUES AND CONCERNS

During the hearing, residents in the area indicated several concerns about the proposed plant. These are discussed in detail in the main report and some of the key concerns are summarized below:

### 1 HEALTH AND SAFETY

### (a) Possible Release of Hydrogen Sulphide ($H_2S$)

Residents were concerned that $H_2S$ might escape from the plant, with serious results for those living nearby.

The plant design includes several safety measures to prevent the release of $H_2S$. However, even if all of those measures failed at the same time, the $H_2S$ concentrations at the nearest residence would be substantially below the compulsory evacuation standard established by Alberta Social Services and Community Health.

### (b) Emergency Response Planning

Residents were concerned about emergency response planning.

Hewitt must submit an emergency response plan. That plan must first be reviewed with residents and must be capable of dealing with worst-case conditions at the plant. The Board must approve the plan before the plant will be allowed to startup.

### (c) Storage and Disposal of Sulphur

Sulphur slurry will be stored on site, in diked, closed, impermeable tanks. The slurry will be removed by a single tank truck once every 2 weeks. Hewitt agreed not to install a sulphur melter at its plant site.

### (d) Plant Inspection

ERCB's senior field staff will make frequent inspections of the plant during construction and will also conduct detailed inspections during and after plant start-up.

## 2 AIR MONITORING

Residents were concerned that the air monitoring proposed by Hewitt was not adequate.

Hewitt proposed to set up a network of sulphation cylinders to monitor the ambient air around the plant. Because the plant is designed not to emit sulphur or sulphur compounds, the Board does not see a need for special monitoring beyond that which would be normally required. However, the final decision on monitoring requirements will be determined by Alberta Environment.

## 3 PLANT OPERATIONS

There was general concern that the Hewitt proposal to staff the plant 4 hours per day would represent a danger to local residents.

Hewitt volunteered to staff the plant 24 hours each day for the first 3 months of operation.

A special condition will require that the plant be fully staffed for at least 3 months, and thereafter until the Board is satisfied that the plant can operate continuously and automatically in a safe manner. Additionally, Hewitt will have to demonstrate that operator response time during future unattended periods will not exceed 30 minutes.

## 4 PROPERTY VALUES

Residents were concerned that the Hewitt plant would cause reduced property values in the area.

The Panel viewed the plant site and nearby residential areas during the hearing. It was acknowledged by residents that oil and gas activities predated the residential development. Recognizing that the proposed plant is much smaller than the nearby Esso plant, the Board believes there will be little if any impact on property values.

## 5 PLANNING FOR ENERGY RESOURCE DEVELOPMENTS IN THE AREA

Residents contended that the proposed plant should be deferred until a more complete process for industrial development planning was in place for the area.

The Board does not have any jurisdiction to implement planning, but has found that the establishment of a community/industry/government liaison committee is effective, in dealing with such matters.

## REASONS FOR DECISION

As discussed in the main report, the Board has carefully considered all of the evidence and is satisfied that the proposed plant can meet all existing regulations and requirements. The Board is satisfied that most of the concerns of nearby residents can be accommodated by special requirements and close surveillance of plant operations. The recovery of sulphur at such a small plant is a technically advanced environmental measure and goes well beyond the existing Alberta guidelines. The Board is convinced that the plant can be operated safely and without causing a health or safety risk to residents in the area.

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

APPLICATION BY HEWITT OIL (ALBERTA) LTD.
FOR APPROVAL OF A GAS PROCESSING PLANT
GOLDEN SPIKE AREA

Decision D 86-3
Application 850583

The Energy Resources Conservation Board considered, at a public hearing in January 1986, an application by Hewitt Oil (Alberta) Ltd. for a small sour gas plant in the Golden Spike area.

## 1 THE DECISION

*The Energy Resources Conservation Board (ERCB, or the Board) has decided to approve the application by Hewitt Oil (Alberta) Ltd. (Hewitt, or the applicant) to build a small sour gas processing plant in the Golden Spike area, south-west of Edmonton. Approval for this plant is also required from the Minister of the Environment with respect to environmental matters.*

## 2 SPECIAL CONDITIONS

ERCB's approval of the Hewitt application is subject to the following conditions:

- Hewitt will be limited to processing 112.7 thousand cubic metres of natural gas per day, although the approved maximum capacity of the plant is 225.4 thousand cubic metres per day. Should Hewitt wish, in the future, to increase the gas throughput to more than 112.7 thousand cubic metres, a new flare stack design, and a plan for twinning the processing equipment, will have to be submitted to, and approved by, the ERCB and Alberta Environment;

- Hewitt must provide 24-hour-a-day supervision at the plant for at least 3 months and thereafter until the Board has been satisfied that the plant can operate continuously and automatically and in a safe manner;

- Hewitt must not drill any water wells in the area.

The Board has approved Hewitt's application after intensive review and consideration of the need for the plant and of the technical details of what is being proposed. The Board is satisfied that the plant is properly designed and can be

operated safely. The Board will have its field staff inspect the plant during construction and operation and will be prepared to communicate the results of those inspections to the Community Liaison Committee which was recommended by the SAGE Study. (See section 7, page 4.)

## 3 GLOSSARY OF TERMS

In studying this ERCB decision report, the reader is reminded that

GSEPS is the Golden Spike Environmental Protection Society
PRRA is the Parkland Rural Residents Association

SOUR GAS is raw natural gas containing hydrogen sulphide
HYDROGEN SULPHIDE ($H_2S$) is an acid gas
SULPHUR DIOXIDE ($SO_2$) is a combustion product when $H_2S$ is burned
SULPHUR is a relatively inert chemical used in fertilizer, steel-making, pharmaceuticals, etc.

Q-SOL is a unit that removes $H_2S$ from natural gas
LO-CAT is a unit that converts $H_2S$ to elemental sulphur

## 4 BACKGROUND TO APPLICATION

Hewitt's slightly sour natural gas (less than 0.5 per cent $H_2S$) was processed at the Esso Golden Spike plant from 1968 until September 1984, when Esso discontinued its gas sweetening operations. Hewitt was unable to negotiate an agreement with Esso to continue gas sweetening operations. Hewitt next tried to inject an $H_2S$ scavenger chemical into the gas stream at its 2-35 well site, to remove the $H_2S$ from the raw gas. However, this operation resulted in excessive flaring and odour complaints from people living nearby and the plan was discarded.

## 5 APPLICATION

In May 1985, Hewitt applied to build and operate a small sour gas processing facility, to be located in Legal Subdivision 8 of Section 27, Township 51, Range 27, West of the 4th Meridian (8-27). (See attached map of proposed plant site.) The proposed plant will have a maximum throughput capacity of 225.4 thousand

cubic metres per day of raw gas, from which 221.6 thousand cubic metres of saleable natural gas and about 1.2 tonnes of sulphur, in a slurry form, could be recovered each day. As noted earlier, the throughput allowed initially will result in only half these amounts without further application to the Board.

## 6 HOW THE PLANT WORKS

The Q-Sol (gas sweetening) and Lo-Cat (air pollution control) units are the main components of the plant. The Q-Sol unit strips $H_2S$ from the sour natural gas, and the Lo-Cat unit converts the $H_2S$ to sulphur, thus avoiding emissions into the atmosphere.

Firstly, water produced with the slightly sour gas from the wells is separated from the gas and stored in a tank. The water is then removed from the site and injected into a deep disposal well isolated from domestic water supplies. The sour gas then is mixed with Q-Sol solvent which absorbs both $H_2S$ and carbon dioxide ($CO_2$), leaving "sweet" natural gas which can then be marketed. The Q-Sol solvent is heated to release the $H_2S$ and $CO_2$ it now contains, and the cleaned solvent then is recycled into the gas sweetening system.

The $H_2S$ which has been removed from the raw gas then goes through an acid gas line to the Lo-Cat unit. In the Lo-Cat unit a liquid catalyst converts the $H_2S$ to sulphur, which is recovered as sulphur slurry and stored in a holding tank until it can be removed from the site.

During the 17 years that Hewitt gas was processed at the Esso plant, the $H_2S$ in the raw gas was burned and discharged to the atmosphere as $SO_2$. The new process will eliminate those emissions during normal plant operations.

The proposed plant will be equipped with a number of proven and widely used safety devices, including an inlet shut-down valve installed downstream of the inlet separator. This valve will close automatically in the event of a power failure, shutting the plant in, and making it necessary for the operator to manually restart it. An $H_2S$ monitor will be installed in the Lo-Cat unit's vent stack to analyse the $H_2S$ concentrations in the unit's vent stream. The inlet separator, and a number of other process vessels, will be equipped with pressure safety valves tied to a system which diverts the gas to the flare stack. The flare stack will be equipped with a continuous pilot flame and an electrical ignition system, and a battery back-up in the event the other ignition systems fail to work.

In the event of an in-plant failure, the emergency shut-down system will be activated, closing the inlet shut-down valve.

Activation of this shut-down system directs a remote alarm to the operator on call.

If the $H_2S$ absorber fluid in the Lo-Cat unit decreases to a pre-set minimum level, the acid gas line to the Lo-Cat unit will close and the acid gas stream will be diverted to flare.

## 7 SAGE STUDY

In October 1985, Edmonton-based SAGE INSTITUTE was engaged by the ERCB to identify concerns of local people and to make recommendations about the impacts of the proposed plant. The Institute's findings were published in the GOLDEN SPIKE SAGE STUDY. (Copies are available from the ERCB. Study recommendations were presented during the hearing.) A major SAGE recommendation was the formation of a community liaison committee to serve as the communications interface between citizens, government, and industry.

## 8 PUBLIC HEARING

An ERCB public hearing to consider the Hewitt application was held at the Sandhills Community Centre, near Spruce Grove, on January 22, 23 and 24, 1986. The hearing panel consisted of Mr. V. Millard, Mr. C. J. Goodman, P.Eng., and Mr. L. A. Bellows, P.Eng. The hearing included a visit by the Panel and hearing participants to the plant site and surrounding area on January 24. (Those who appeared at the hearing are listed in the attached table.)

## 9 ISSUES AND CONCERNS

A number of issues and concerns were identified, both by individual residents during the hearing, and as a result of the SAGE Study. These concerns included

### 9.1 Health and Safety

Concerns regarding health and safety can be grouped in five broad categories, as shown below:

### a) Potential for $H_2S$ Release -- Plant Equipment

Most of the interveners expressed concern about the plant's safety features. One of GSEPS's main concerns was the effectiveness of the $H_2S$ monitor in the Lo-Cat vent stack.

Hewitt pointed out that the $H_2S$ monitor will automatically call out the operator at a pre-determined warning level. At a higher level of $H_2S$, the monitor will send an electronic signal to the plant's emergency system, causing it to divert the acid gas to the flare stack where the $H_2S$ will be converted to $SO_2$ by burning.

Hewitt proposed to install a differential pressure gauge as part of the plant's safety system. This gauge will detect foaming of liquids in the Lo-Cat vessel, and will ensure the effectiveness of the $H_2S$ monitor in the Lo-Cat vent stack.

Hewitt further explained that there will be no significant releases of $H_2S$ in the event of a failure of the plant equipment. The plant's pressure vessels are equipped with pressure safety valves which protect the equipment from rupturing by diverting the gas to the plant's flare stack. Hewitt said that the possibility of all plant equipment and safety devices failing simultaneously is extremely remote. However, in the very unlikely event that total failure does occur, it will only result in the same level of $H_2S$ emissions described in the worst-case scenario in section 9.1 b), page 6.

One resident suggested that the very minute quantities of $H_2S$ that will be vented to the atmosphere from the Lo-Cat's vent stack should be continuously burned at the flare stack. Hewitt replied that this gas stream would be saturated with water and would not burn.

Overall, the ERCB believes that the applicant has provided adequate safety features for the proposed plant and is satisfied that these are at least comparable with those presently in use at other sour gas processing facilities of similar size in the province. The ERCB recognizes the concerns of area residents about safety, but believes that the plant is satisfactorily designed.

### b) Potential for $H_2S$ Release -- Inlet and Acid Gas Lines

There are two separate and distinct pipelines associated with the Hewitt plant and carrying $H_2S$. The first is the high-pressure inlet line extending to the plant from the edge of the plant site and delivering raw sour gas. The second is the acid gas line connecting the Q-Sol and Lo-Cat units inside the plant.

When asked to define the worst-case scenario in the event of a pipeline failure, Hewitt chose the acid gas line because, even though that line contains gas under very low pressure, the gas is high in $H_2S$ content and is heavier than air, thus delaying dispersion of any release to the atmosphere. Hewitt calculated that a rupture of the acid gas line, with a total safety system failure, and also under the worst meteorological conditions, would cause a ground level $H_2S$ concentration at the nearest residence (about 450 metres from the plant site) of 8 parts per million (ppm). That concentration would exist for only a very limited period of time, and Hewitt stated this concentration is less than the Alberta 8-hour occupational exposure limit of 10 ppm.

Hewitt contended that the probability of a rupture of the acid gas line was exceedingly low. Using ERCB data on sour gas line failures, Hewitt claimed that there is no record of ruptures of low-pressure acid gas lines. Additionally, the acid gas line will be built to withstand operating pressures of 1725 kilopascals (250 psig), but will normally operate at only 69 kilopascals (10 psig) which provides an additional safety factor.

Hewitt further calculated that a rupture of the sour gas inlet line would result in significantly lower $H_2S$ concentrations than calculated for the acid gas line.

Dr. Hage, a witness for GSEPS, questioned Hewitt's estimate because it assumed that pipeline ruptures had historically occurred randomly along the entire length of sour gas lines. Dr. Hage argued that ruptures actually had tended to occur near valves and joints and therefore the risk of a break could be quite different than that suggested by the applicant.

The Board generally agrees with the worst-case calculations of $H_2S$ concentrations as made by Hewitt. Those calculations include several conservative assumptions. Additionally, the Board notes that 170 sour gas processing plants in Alberta have acid gas lines, yet there has never been a rupture of an acid gas line in the 30-year

history of the Alberta sour gas processing industry. The Board therefore concludes that a failure of the acid gas line is most unlikely. However, even if there were a rupture and all of the plant's safety shut-down systems failed at the same time, the $H_2S$ concentrations at the nearest residences would be much less than the compulsory evacuation levels established by Alberta Social Services and Community Health.

### c) Emergency Response Planning

Hewitt must submit an emergency response plan to the Board prior to plant start-up. That plan must first be reviewed with concerned citizens and must be capable of dealing with worst-case conditions arising out of incidents involving the plant. The Board must approve the emergency response plan before the plant will be allowed to start up.

### d) Storage and Disposal of Sulphur Slurry

Hewitt proposed using a Lo-Cat unit to eliminate $SO_2$ emissions by converting $H_2S$ removed from the raw gas into a sulphur slurry. This sulphur slurry first will be stored on site, in diked, impermeable, closed polyvinyl chloride (PVC) tanks. The sulphur slurry will be sold for use in fertilizer, or disposed of at an approved landfill site. The sulphur slurry will be removed from the plant site by a single tank truck once every 2 weeks. Hewitt is obligated to promptly clean up any spill of sulphur and to restore the affected area to its normal condition.

GSEPS strongly opposed any sulphur melting anywhere within Division One of Parkland County. Hewitt agreed not to install or use a sulphur melter at its plant site.

GSEPS requested that no open air storage of sulphur be permitted, to eliminate odours and prevent possible pollution of air, soil, or water. As mentioned above, the sulphur slurry first will be stored in PVC tanks that will not be open to the atmosphere, and then will be removed from the site.

The Board is satisfied that the residents' concerns have been addressed and foresees no problems with the storage of sulphur as proposed by Hewitt. The fact that the applicant plans to recover the sulphur, rather than emit $SO_2$, is commendable and goes beyond the Board's present requirements.

### e) Inspection During Construction and Plant Start-up

Hewitt stated that plant construction would take 4-6 weeks, working 10-12 hours per day. During the plant's start-up phase, the company proposes to have, at the site, representatives from the suppliers and manufacturers of the Q-Sol and Lo-Cat units, and other equipment suppliers as necessary, as well as its own staff.

PRRA said there was a need for proper supervision during plant start-up, and for a full evaluation of the plant after it had started up. Presenting these inspection evaluations to local people would help alleviate their concerns and apprehensions, PRRA argued.

The applicant suggested that it would take 2-7 days for all the units to be properly tested after installation, operators trained, and the plant fully commissioned so that it could operate unattended. However, because of residents' concerns, Hewitt committed to 24-hour-per-day operator attendance at the plant for the first 3 months.

The Board agrees that close and frequent inspections of the proposed plant are necessary during construction and start-up. As stated earlier, ERCB's senior field staff will make frequent inspections during construction, will witness the start-up, and will conduct detailed inspections after the plant is on stream. The Board is willing to report its findings to area residents through the liaison committee recommended in the SAGE Study.

## 9.2 Air Monitoring

The applicant stated there are only two possible sources of emissions from the proposed plant. The first is the very minute emissions of $H_2S$ from the Lo-Cat vent stack which will occur during normal plant operations. According to Hewitt, the maximum ground level $H_2S$ concentration arising from this emission source would be 0.0002 ppm on a 1-hour average, well below the 0.01 ppm $H_2S$ standard established by Alberta Environment. The second would be the $SO_2$ emissions from the flare stack during plant upsets or an emergency. These $SO_2$ emissions would be, on a 1-hour average, less than Alberta Environment's 0.17 ppm $SO_2$ standard. Hewitt reiterated that an $H_2S$ monitor -- designed to analyse vent gas -- will automatically call out the operator and shut in the plant if concentrations of $H_2S$ rise above a predetermined level. There will be no emissions of $SO_2$ from the flare stack during normal operating conditions, according to the applicant.

Alberta Environment's flare-stack-design computer model was used to determine the proper height for the flare stack. If the entire sour gas flow has to be flared, the maximum concentration of $SO_2$ will be 0.163 ppm at tree-top level (less at ground level), calculated on a 1-hour average, compared to the Alberta Environment standard of 0.17 ppm. Hewitt agreed that the flare stack height would have to be re-evaluated before the plant's production could be increased above 112.7 thousand cubic metres per day.

GSEPS was concerned about incomplete burning of $H_2S$ from the flare stack. Hewitt stated the stack was for emergency use only and would be equipped with a wind shroud, continuous pilot, and a continuous electronic igniter. Battery back-up will ensure ignition in the event of a power failure. In addition, sweet gas will automatically be added to any acid gas being burned to ensure complete combustion. A flow recorder will be installed to record the frequency and quantity of acid gas being flared.

Hewitt proposed to set up a network of sulphation cylinders to measure $H_2S$ (and total sulphation) in the ambient air around the proposed plant, in accordance with the requirements of Alberta Environment. Monitoring results will be submitted monthly to Alberta Environment and these reports will be available to the public.

The interveners expressed general skepticism about industry doing its own air monitoring. They recommended that a continuous ambient air monitoring trailer be located downwind of the proposed plant, to be operated by Alberta Environment, or some other third party, for 3 months before construction of the plant, and at least 3 years after plant start-up. This would help the company deal with future complaints from residents that may or may not be justified, GSEPS argued.

Hewitt claimed that by monitoring the ambient air quality they might pick up emissions from other sources, as well as their own, yet not be able to determine which facility was responsible.

The Board notes that $SO_2$ would rarely be emitted and that monitoring of $SO_2$ emissions would be carried out in accordance with Alberta Environment's requirements. The very minute amounts of $H_2S$ emitted from the Lo-Cat vent stack do not warrant extra monitoring beyond the monitor in the Lo-Cat unit itself, plus the proposed sulphation cylinders. The Board does not see a need for an independent air monitoring trailer, but believes this to be a matter for Alberta Environment.

## 9.3 Plant Operations

GSEPS maintained that the plant should be staffed at all times to ensure an immediate response to any upset. The applicant stated that only 1 hour per day would be required for staff to carry out normal daily plant operations. However, in response to citizen concerns, the company has budgeted 4 hours per day. Hewitt then proposed a trial period of 3 months with 24-hour-per-day supervision at the plant.

The Board makes it a condition of approval that the plant be continuously staffed for a minimum of 3 months, at the end of which time the Board will fully review the plant's operating performance. ERCB senior field staff will make regular inspections of the facility during this period and will be prepared to report their findings to area residents through the liaison committee proposed for the area.

The interveners also argued against the maximum 30 minutes Hewitt said it would take the plant operator to respond to an alarm.

In view of the low $H_2S$ concentrations, and the safety features incorporated in the plant design, the Board finds that a 30-minute response time will be satisfactory, but it will require the applicant to satisfy the Board that this will be achieved.

The Board realizes that the concept of an unmanned sour gas processing plant might appear unsatisfactory at first glance, but similar automatic control technology has proven effective under a variety of conditions. At present, there are 116 small sour gas plants operating safely in Alberta that are staffed only part of the time.

## 9.4 Energy Resource Planning

Two major concerns of interveners were the possibility for increased energy or industrial development in the area, and the need for a liaison committee made up of area residents, industry, government departments (such as Alberta Environment), the ERCB, and other regulatory agencies, to improve communications between all parties.

GSEPS stated that one of the community's key concerns was the possibility of more sour gas plants, or other large installations associated with oil and gas development, being built in Division One of Parkland County. The interveners said they did not want any further expansion of the proposed Hewitt plant beyond the maximum capacity already proposed. Given a choice, GSEPS preferred a smaller plant with a longer life, rather than a larger plant with a possibly shorter life.

During its early contacts with area residents, Hewitt realized that no plants were welcome in the area. However, if there had to be gas processing facilities, residents seemed to want only one. Hewitt advised, therefore, that it had decided to apply to the ERCB for double its required capacity, hoping to avoid any future need for other plants in the area. Hewitt maintained that its primary interest was processing its own gas. It did not plan to become a common processor for the region; however, the company would be willing to make its spare plant capacity available to other reserves owners in the area if requested.

GSEPS recommended that the Board defer making a decision on the Hewitt application until the Board could conduct an inquiry into resource and urban development planning within Division One of the County of Parkland. Such an inquiry might lead to development of guidelines acceptable to both industry and residents, they argued. Failing that, GSEPS recommended that the Board's decision be delayed until the County of Parkland finalized its review of existing planning legislation.

PRRA expressed a strong belief that Hewitt's application might be just the first phase of continued energy development in the area. The association suggested that a liaison committee might be helpful if it ensured information exchange and feedback to residents. GSEPS claimed that only a Crown agency, with regional authority, would be the appropriate body to deal with such matters. Such an agency could set up a task force to study the matter and to make recommendations to Ministerial or Cabinet level. This might then lead to legislation allowing for the co-existence of energy developers and area residents.

GSEPS believed a liaison committee had limited merit because it would lack the authority to resolve land use and planning issues. However, they acknowledged that the SAGE Study did get industry and local residents communicating.

The Board believes that Hewitt's application for double the capacity needed to process its own gas could assist in avoiding the need for other sour gas processing plants in the area. The Board also believes a liaison committee would be beneficial to both area residents and industry, permitting any future plans by industry to be openly discussed.

The Board is not prepared to conduct an inquiry into resource and urban development, largely because in the two instances where it has conducted such inquiries the end result has been establishment of a community liaison committee, which is what the SAGE Study already had recommended.

## 9.5 Plant Location

Hewitt advised that, after meeting initially with area residents, it had changed the site of its proposed gas plant from its 2-35 gas well lease site to the proposed site at 8-27. This site is 500 metres north of the Esso Golden Spike plant. The applicant stated that since its new site already had pumpjacks, underground pipelines, and other existing oil and gas equipment, the incremental visual impacts would be minimal, if any. In response to GSEPS's question as to why the proposed plant could not be built on the existing Esso site, Hewitt said Esso would not agree to the idea, and there was nothing further Hewitt could do.

According to GSEPS, people living within 1.5 kilometres of the site viewed the proposed plant as being "literally in their back yard". The Society thought that a site some 5 kilometres to the west of the 8-27 site should be considered because it was in a less populated area, on lower-lying ground, and the plant would have less visual impact. However, they did not want to specify an exact site. They argued that planning authorities should designate land for industrial use. Furthermore, the Society wished to maintain good relations with their farming neighbours and did not want to burden them with a gas plant. Hewitt stated it was not prepared to consider an alternate site because it felt the proposed 8-27 site was suitable.

PRRA did not suggest an alternate site, but stated that the proposed plant should first be tested in a remote area, away from people, where the technology proposed by Hewitt could be monitored and assessed. Once testing was completed, the findings could then be shared with the community. If the plant's performance proved satisfactory in the remote area, this might help to allay some concerns.

Having viewed the site during the hearing, and recognizing that it already has pumpjacks, wells, and pipelines, the Board believes Hewitt's proposed plant will not add any significant visual impact to the area. The proposed plant will be quite small, with equipment housed in three buildings painted an appropriate colour to minimize visual impact. Further, an alternative to the 8-27 site may require additional pipeline construction, which could result in added land disturbance, and extra cost. The Board therefore concludes that the proposed site is acceptable.

## 9.6 Property Values

Area residents were obviously proud of their homes and most had deliberately chosen a country lifestyle. At the same time, they recognized that the oil and gas industry has been active in the area for a considerable period of time. Indeed, some people at the hearing advised that they had acquired their properties knowing that energy developers were active nearby.

From viewing the site, it was apparent that the proposed plant will be visible from only a few homes. Additionally, existing pipelines from Hewitt's wells pass very close to the proposed plant site, thus minimizing the need for new pipeline construction through the area.

Both PRRA and GSEPS believed the proposed plant would lower the value of homes in the area because of widespread concerns about sour gas. They claimed that property values had already been affected by the existing Esso plant and they suggested the Hewitt plant could reduce values further and affect the ability to sell property within a reasonable marketing time. The loss to property owners would vary according to the distance from the plant, GSEPS said. With many properties already up for sale, the Society feared buyers might choose acreages away from sour gas wells and related facilities.

Hewitt suggested that property values would not decline because most residents had bought their homes knowing sour gas was already being processed in the area. Hewitt explained that the Esso plant has emitted $SO_2$ for many years and it questioned how the continuation of sour gas processing, with virtually no emissions, would cause property values to decline. Hewitt suggested its proposed plant could actually improve air quality if it processed the solution gas that some operators were currently flaring at batteries near the 8-27 location.

The Board recognizes residents' concerns about sour gas, and about the effects a sour gas processing plant might have on local property values. It appears, however, that the Esso plant, which was emitting $SO_2$ for years, did not inhibit the purchase of property in the past, and as the proposed Hewitt plant will be much smaller, and will only rarely emit $SO_2$, the Board concludes that the plant's effect on property values will be minimal.

## 9.7 Water Supply and Runoff

According to the applicant, the proposed plant will use about 600 gallons of water per day. Hewitt stated it will buy its water from Esso, which is currently piping water from the North Saskatchewan River to its Golden Spike plant. Hewitt agreed that it will not drill any water wells in the area and this commitment seemed to alleviate concerns regarding local water supplies.

Surface runoff water was another concern of GSEPS. The Society believed that certain chemicals could mix with surface runoff water from the plant and pose a danger to the environment over a long period of time. The Society argued that all water should be collected in an impervious pond, to then be checked by Alberta Environment before being allowed to drain into the local watershed.

Hewitt claimed that surface runoff water would not be affected because the plant site will be graded to follow the original natural surface runoff patterns. The company said it would dike all storage vessels and house all operational equipment in buildings. Hewitt further stated that any spill or leak would be contained within the building, and this would allow prompt clean-up.

The Board will make it a condition of approval that Hewitt not drill any water wells in the area. The Board is satisfied with the applicant's proposal to house all plant equipment and vessels in buildings, or within dikes. As no surface runoff water will come in contact with any spilled materials, the Board believes retention ponds, or containment and treatment of runoff water, are not required; however, this is a matter to be reviewed by Alberta Environment.

## 9.8 Road Traffic

The applicant claimed that traffic generated by the proposed plant would be insignificant in comparison to the daily commuter traffic to Edmonton. Sulphur slurry will be trucked out once every 2 weeks and the produced water trucked out once every 3-4 weeks.

GSEPS agreed that the plant would bring only a marginal increase in traffic. The Society was more concerned about which roads would be used, as roads in the area are fairly narrow, and Woodbend and Pioneer Roads are uneven and not hard-surfaced. The interveners stated there was already a significant amount of traffic, due in part to the Esso Golden Spike plant, and this became even heavier at certain times of the day because of commuter traffic and school busses.

GSEPS recommended that vehicles of more than 1-ton weight, going to and from the proposed plant, should use routes other than Woodbend or Pioneer Roads. They suggested Golden Spike Road or Garden Valley Road, both of which are wider and hard-surfaced.

Hewitt stated it would abide by all local transportation laws, particularly those relating to the use of commercial roads. The company pointed out, however, that to restrict itself to certain roads could prevent it from using particular routes under emergency conditions. Hewitt was not prepared to accept such a restriction.

The Board does not have the authority to specify truck routes on public roads. Additionally, it agrees with Hewitt that the increase in traffic due to the proposed plant will be marginal but, in any event, road use is a matter that could be reviewed by the community liaison committee. The Board also agrees with Hewitt that limitations on the use of particular roads might affect the operator's response time

in the event of an emergency at the plant. As a prudent operator, Hewitt should ensure that any large trucks serving its plant do, indeed, use the most suitable routes.

### 9.9 Construction Materials

The interveners also questioned some of the construction materials Hewitt intends to use in the gas processing components of its plant. GSEPS stated that stainless steel or PVC were more appropriate for the Lo-Cat unit. Hewitt said it would use coated carbon steel, but GSEPS claimed that this would not last as long as stainless steel or PVC. Hewitt said all materials in its plant will conform to the applicable standards for the types of gases and liquids to be processed.

The Board is satisfied with Hewitt's explanation of its plant design and with the construction materials that Hewitt proposes to use in its plant.

## 10 SUMMARY OF THE BOARD'S REASONS FOR ITS DECISION

As discussed in this report, the Board has carefully considered all of the evidence and is satisfied that the proposed plant can meet all existing regulations and requirements. The Board is satisfied that most of the concerns of nearby residents can be accommodated by special requirements and close surveillance of plant operations. The recovery of sulphur at such a small plant is a technically advanced environmental measure and goes well beyond the existing Alberta guidelines. The Board is convinced that the plant can be operated safely and without causing a health or safety risk to residents in the area.

Dated at Calgary, Alberta, on 23 May 1986.

ENERGY RESOURCES CONSERVATION BOARD

Millard
V. Millard
Chairman

Bellows
L. A. Bellows, P.Eng.
Board Member

C. J. Goodman
C. J. Goodman, P.Eng.
Board Member

## THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations used in Report) | Witnesses |
|---|---|
| Hewitt Oil (Alberta) Ltd. (Hewitt)<br>J. R. Smith, Q.C. | T. B. Hewitt<br>D. Varvos<br>E. Dowd<br>of ARI Technologies<br>C. R. Darsi, P.Eng.<br>of Darsi Engineering Ltd.<br>M. B. Schroeder<br>of Western Research |
| Golden Spike Environmental Protection Society (GSEPS)<br>D. Thurston | J. Ironside<br>M. Gray, P.Eng.<br>K. Hage, P.Eng.<br>G. Downey |
| Parkland Rural Residents Association (PRRA)<br>S. Cherwonick | S. Cherwonick<br>L. Proudfoot |
| SAGE Institute of Canada Inc. (SAGE) | J. D. Dilay, P.Eng.<br>of the Energy Resources Conservation Board<br>B. Stringham |
| J. C. and M. K. Murray | J. Murray |
| N. Fiertel | N. Fiertel |
| R. J. Matthews | R. J. Matthews |
| Esso Resources Canada Limited<br>F. Ferguson | |
| C. S. and M. E. MacIntosh | |
| S. Millette | S. Millette |
| R. Voogel | R. Voogel |

## THOSE WHO APPEARED AT THE HEARING (cont'd)

| Principals and Representatives (Abbreviations used in Report) | Witnesses |
|---|---|
| Mrs. Nagy | Mrs. Nagy |
| Her Majesty the Queen in Right of Alberta<br>S. L. Dobko of Alberta Environment | |
| Energy Resources Conservation Board staff<br>H. R. Hansford<br>M. Semchuck, C.E.T.<br>J. L. Weleschuk | |

Esso asked to be registered at the hearing, but did not present any evidence, or cross-examine. The Edmonton Metropolitan Regional Planning Commission, S. Van Stolk, T. and L. Paulson, H. and E. Rasmussen, A. and S. Gronberg, M. and L. Ozerkevich, and C. Frederiksen, filed submissions but did not appear at the hearing to present any direct evidence or to cross-examine.

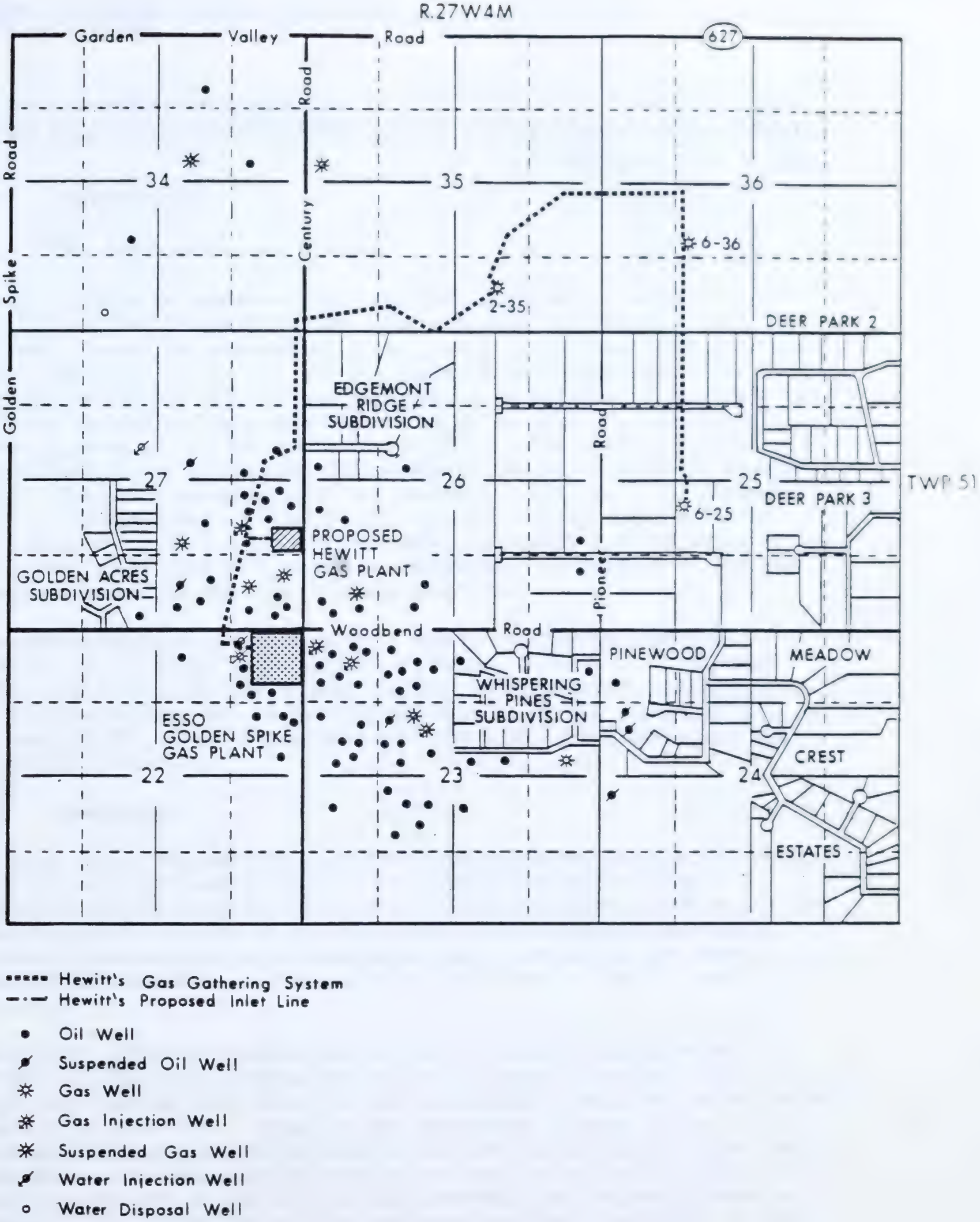

FIGURE 1 - HEWITT'S GAS GATHERING SYSTEM AND AREA

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

ATLAS YELLOWKNIFE RESOURCES LTD. Decision D 86-4
PIGEON LAKE GAS PROCESSING PLANT AND OIL BATTERY Application 850819

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## 1 INTRODUCTION

### 1.1 The Application and Hearing

Atlas Yellowknife Resources Ltd. applied, pursuant to section 26 of the Oil and Gas Conservation Act, for approval to construct and operate a sweet gas processing plant, and in accordance with sections 7.001 and 7.002 of the Oil and Gas Conservation Regulations, for a central multi-well oil battery adjacent to an existing single-well oil battery located in legal subdivision 16 of section 25, township 47, range 2, west of the 5th meridian (16-25), in the Pembina Field, approximately 1.6 kilometres (km) north of the north shore of Pigeon Lake. The plant would process and conserve a maximum of 34 thousand cubic metres per day ($10^3$ $m^3/d$) of currently flared sweet solution gas, from which 30.0 x $10^3$ $m^3/d$ of sales gas and 6.7 $m^3$ of liquefied petroleum gases (LPG mix) would be recovered. No sulphur or sulphur compounds would be emitted to the atmosphere.

The application was considered at a public hearing in Edmonton, Alberta, on 19 March 1986, with V. E. Bohme, P.Eng., C. J. Goodman, P.Eng., and H. J. Webber, P.Eng. (acting Board Member), sitting. The 16-25 site was visited as part of the hearing on the afternoon of 19 March 1986. Those who appeared at the hearing are listed in the following table.

### 1.2 Background

In 1983, Atlas Yellowknife placed on production two Cardium oil wells in 14-19-47-1 W5M and 16-19-47-1 W5M from a surface location in 6-30-47-1 W5M (see attached figure). Since that time solution gas has been burned in a flare at this location. After placing additional wells on production, Atlas Yellowknife was directed by the Board to evaluate conservation of the solution gas flared at its oil wells in the area.

Initially, Atlas Yellowknife applied for a battery and plant site at 10-29-47-1 W5M (10-29) adjacent to two existing oil wells. The applicant learned that the residents of Sundance Beach and others were opposed to this site. Based on the suggestion of some of the residents, it proposed relocating to 13-30-47-1 W5M (13-30), but the residents of Mitchell Beach and Mission Beach objected to this location and wanted the site farther removed from the north shore of Pigeon Lake. Subsequently, the applicant obtained the rights to the 16-25 location and amended its application for approval of the battery and gas plant at that location.

## THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Atlas Yellowknife Resources Ltd.<br>(Atlas Yellowknife)<br>D. A. Holgate | D. Sodero, P.Geol.<br>J. K. Birrel, P.Eng. and<br>R. Langen, P.Eng.<br>of Frontier Engineering & Consulting Ltd. |
| C. Kenway (Councillor and Deputy Mayor of Sundance Beach) | C. Kenway |
| Residents of Mitchell Beach | |
| J. B. Haliburton | J. B. Haliburton |
| G. Hutchinson | G. Hutchinson |
| Energy Resources Conservation Board staff<br>H. R. Hansford<br>R. Keller<br>M. Semchuck, C.E.T.<br>V.H.P. Seaman, C.E.T. | |

Erskine Resources Limited, Lear Real Estate Ltd., and the Village of Thorsby filed interventions but did not appear at the hearing.

## 2 THE ISSUES

The Board considers the issues regarding the application to be

- the need for the proposed battery and gas plant, and
- the suitability of the proposed site.

## 3 THE NEED FOR THE PROPOSED BATTERY AND PLANT

Atlas Yellowknife stated that the proposed 16-25 central oil battery and gas processing plant are required to

- consolidate its single-well oil batteries which are located along the north side of the lake,
- conserve the sweet solution gas currently flared at each of these individual installations, and
- reduce truck haulage and flaring at existing small batteries.

The applicant indicated that there are no existing plants suitable to process the produced gas. It considered the possible use of the Texaco Bonnie Glen gas plant located in 4-17-47-27 W4M but rejected this alternative as the plant is approximately 18 km from the applicant's wells. In order to deliver its raw solution gas to the Texaco plant for processing, Atlas Yellowknife would have to install a compressor facility somewhere on the north shore of Pigeon Lake.

Mr. Kenway and Mitchell Beach residents acknowledged that a central battery and gas plant somewhere in the area was required, but the Mitchell Beach residents and Mr. Hutchinson opposed the applicant's proposed 16-25 location.

The Board believes that gas from the oil wells should be conserved and it notes that no plants exist nearby to process Atlas Yellowknife's gas. The Board accepts the applicant's position that there is a need for a central oil battery and gas processing facility in the area in order to consolidate its existing lakeshore single-well batteries and to process and conserve the solution gas presently being flared.

## 4 SUITABILITY OF THE PROPOSED SITE

### 4.1 Applicant's Views

Atlas Yellowknife stated that it investigated other sites at 10-29 and 13-30, but both were rejected because they were closer to the shore of Pigeon Lake than the 16-25 site and because of the area residents' opposition to these sites. The 16-25 site was preferred as it would be immediately adjacent to Dome Petroleum Limited's (Dome) long-established 16-25 single-well oil battery and therefore visual impact would be reduced. The applicant emphasized that its 16-25 site is approximately 1.6 km from Mitchell and Mission Beaches and about 2.5 km from Sundance Beach. Atlas Yellowknife said that the proposed plant and battery site is in an open field which is gently sloping to the southwest and, because of intervening trees and small ridges, lakeshore cottages are not visible from the site.

The 16-25 site is already serviced by an access road running to the Dome 16-25 well site and Atlas Yellowknife indicated it has made arrangements with Dome to use the access road. The site would be immediately adjacent to Pembina Pipelines Ltd.'s existing crude oil pipeline which would provide a tie-in point for oil shipment.

As referred to in Section 3 of this report, Atlas Yellowknife emphasized that use of the 16-25 site would eliminate many impacts such as noise, visual impacts, and traffic caused by its present operations in the area.

The applicant stated that gas flaring caused by plant upsets or scheduled shutdowns requiring plant depressuring would be infrequent and of short duration. To minimize the sight of such infrequent controlled flaring episodes, it intended to use a flare pit rather than a conventional flare stack.

Atlas Yellowknife said that it would attenuate plant noise by installing residential class mufflers on the gas engines driving the main gas and refrigeration compressors, by directing the gas compressor's cooler fan away from the nearest dwelling, and by lining the compressor building with acoustic material to minimize noise transmission.

The applicant considered using electric motors for the compressors but this was rejected due to operational difficulties in handling varying volumes of solution gas. It claimed that the cost of operating electrically-driven equipment was six times greater than that of gas-driven equipment. Atlas Yellowknife stated that it provided electric power for all its pumpjacks in response to the area residents' concerns about noise. The applicant submitted that a noise study it commissioned showed the proposed facilities would cause no noise impact beyond 1 km.

Atlas Yellowknife stated that the potential for a spill of fluids onto the 16-25 site and contamination of the lake was very remote. However, to protect against this possibility, it proposed to construct a 1-metre (m) high berm of impervious material around its 110-m x 110-m site and provide a separate inner dike around the oil storage tanks. The tank dike would have sufficient capacity to contain a minimum of 24 hours of oil production in addition to the capacity of the two 53-$m^3$ storage tanks. Surface runoff water would be diverted around the 16-25 site.

Atlas Yellowknife said that its wells would have high- and low-pressure shutdown switches which would shut off the electricity to the pumpjack motors if a pressure gain or loss in the pipeline was detected. The gas plant would be equipped with an automatic shutdown system and a plant operator would be in the area 8 hours each day and would be on call 24 hours a day. If a plant upset occurred, detection equipment at the plant would page the operator who could respond within 30 minutes. A 2-m-high chain link fence would enclose the 16-25 site, and it would be locked during unattended periods. A 24-hour telephone number would be posted at the site to allow the public to contact the operator.

Atlas Yellowknife stated that, although the 16-25 site was not central to its producing oil wells, it was prepared to incur additional oil and gas gathering costs to accommodate the concerns of the local residents. It said, however, that it could not accept the alternative location suggested by Mitchell Beach residents which was 1.5 km north of its 16-25 site. Moving the production from the pumping wells that extra distance would reduce oil production rates due to increased back pressure at each wellhead. These production losses, together with the increased costs associated with the more distant location, would make the project uneconomic.

The applicant concluded that its scheme would ensure that its currently flared volumes of solution gas would be conserved and it would have the potential to conserve future gas while eliminating visual, traffic, and noise impacts caused by its present operations. Atlas Yellowknife stated that significant benefits to the lakeshore residents and the province as a whole arise as a result of its project and it maintained that the impacts of its proposal would be negligible.

## 4.2 Interveners' Views

Mr. Hutchinson, who resides at the southeast corner of the southeast quarter of section 25-47-2 W5M on property that lies between the applicant's lakeshore wells and the 16-25 site, expressed concern regarding further development in the area. He said the area north of the lake had some unique historic resources and contended that, if the applicant's scheme were approved, this could lead to future expansion and more industrial-type development in the heartland of a nature preserve.

Mitchell Beach residents expressed concerns about possible noise. They claimed that noise from the 16-25 site would be audible at the lakeshore and for that reason they objected to the applicant's proposal to use gas-driven compressors.

The interveners expressed concerns about possible pollution of the lake. Mr. Hutchinson indicated that the 16-25 site would be in the watershed and drainage area that feeds the lake and he was concerned about contamination of this source of the lake's water.

Mr. Kenway stated that, if the battery and plant site could not be relocated further north, then there should be provision for a system of berms to prevent contaminants spilling from the site.

The Mitchell Beach residents objected to the 16-25 site, claiming that it could cause serious environmental impact to the lake and its drainage system and that it would also impact lakeshore residents. They said that their concerns regarding pollution of the lake were not alleviated by the applicant's commitment to construct and maintain appropriate berms at the site, noting that a berm at another operator's well in the area failed to contain runoff water which spilled into the lake's drainage system.

The Mitchell Beach residents stated that they would not oppose the project if the applicant's facilities were situated at their preferred location about 1.5 km north of the 16-25 site, as it would put the site out of the Pigeon Lake drainage basin. Mr. Hutchinson stated that being an immediate neighbour to Mitchell Beach, he understood and supported their views.

### 4.3 Board's Views

The Board accepts that the lakeshore areas and lake provide a valued recreational area. However, it recognizes that the applicant considered two locations for its proposed facilities but rejected both because lakeshore residents had concerns about these sites. The Board recognizes that Atlas Yellowknife has selected a location farther from the lakeshore and immediately adjacent to Dome's 16-25 battery which has been operating for many years. Furthermore, the applicant would use Dome's existing access road. The Board believes that the applicant's scheme would bring about a reduction of certain existing impacts from operations near the lakeshore.

The Board notes that the distance from the 16-25 site to any of the interveners' residences is at least 1.5 km. The applicant's noise study indicated that the noise level at a residence 450 m to the northeast would be between 30 to 35 decibels, while at a dwelling 300 m to the southwest the noise level would be 35 to 40 decibels. The Board further notes that the study concluded that at a 1-km distance from 16-25, there would be no noise impact. On the basis of the noise study and the site visit, the Board believes that noise impact would be modest.

The Board recognizes Atlas Yellowknife's commitment to install and maintain adequate berms around the storage tanks and plant site. It believes these undertakings are adequate to ensure that surface runoff water would not come in contact with any of the facilities on the 16-25 site and that liquid contaminants should not spill from the site. The Board further believes that the tanker trucks hauling crude oil from the single-oil batteries near the lakeshore pose a greater threat to the water of Pigeon Lake than would an adequately diked and regularly maintained battery and plant site at 16-25.

The Board notes that Atlas Yellowknife would equip its processing facilities with sensors and alarms to ensure that its operator responds promptly to any abnormal plant operations. It further notes that high- and low-pressure shutdown switches would be installed at the producing wells to ensure safe operations, eliminate spills, and control line failures.

The Board accepts that oil production rates could decline somewhat if the site was relocated 1.5 km farther away from the wells, as proposed by the interveners; moreover, the extra cost of locating the facilities there is not warranted.

The Board does not believe the facilities proposed by Atlas Yellowknife will be the start of industrialization of the area. There is no indication that other industrial operators would be attracted to the site and, in any event, the proposal of additional energy facilities would be subject to further consideration by interested parties and by the Board.

The Board believes that Atlas Yellowknife has considered such matters as inconvenience to residents, surface and environmental impacts, and economic considerations, and concludes that the applicant has selected a suitable location for the battery and gas plant. The 16-25 site would have minimal impacts, if any, and not sufficient to warrant denial of the application.

## 5 DECISION

Having considered all of the evidence, the Board is prepared to approve Atlas Yellowknife's application to construct and operate a battery and gas plant at 16-25. The Board's approval of the plant application would be subject to the approval of the Minister of the Environment with respect to environmental matters.

DATED at Calgary, Alberta, on 21 April 1986.

ENERGY RESOURCES CONSERVATION BOARD

Bohme

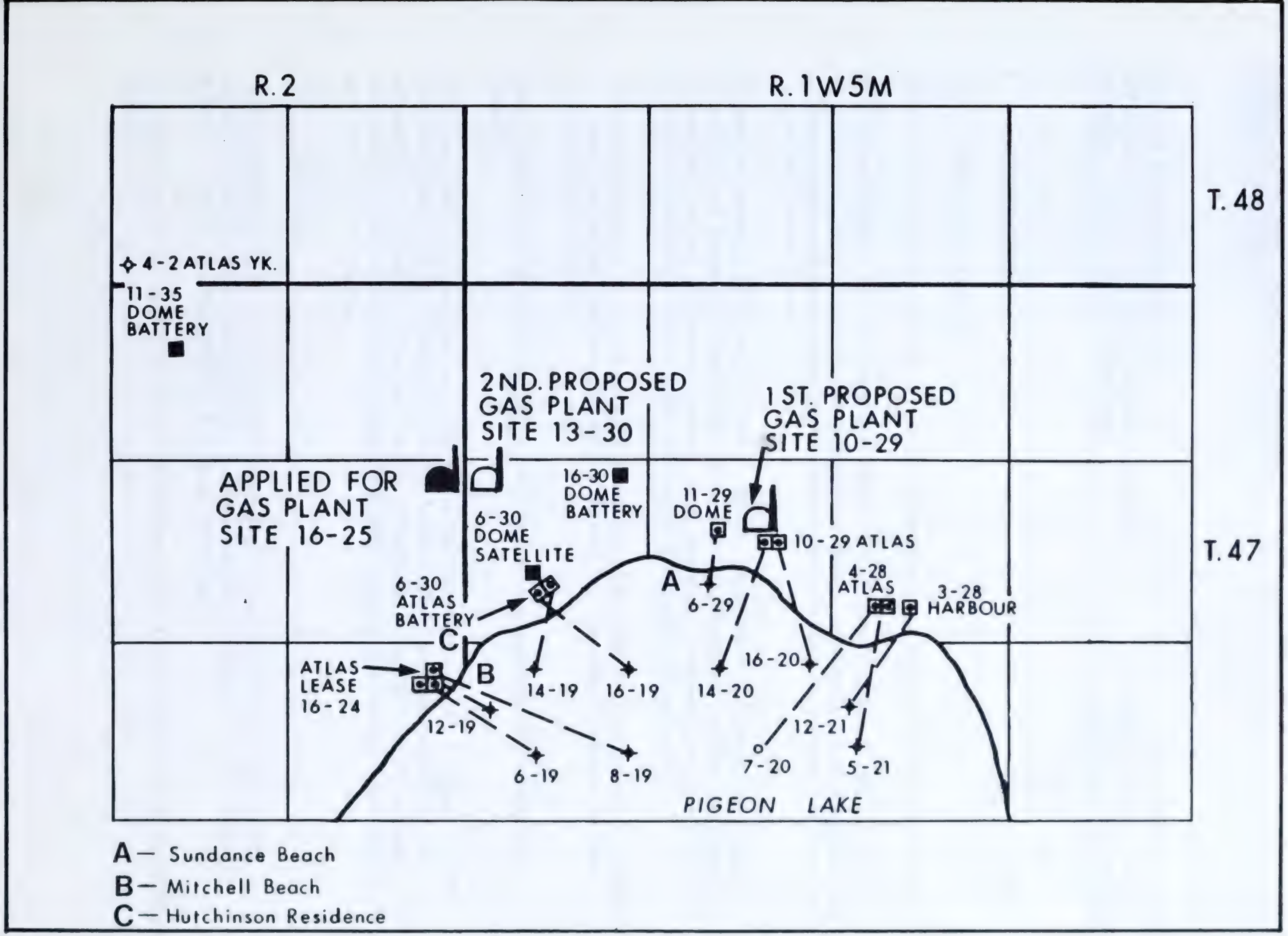
V. E. Bohme, P.Eng.
Board Member

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

H J Webb

H. J. Webber, P.Eng.
Acting Board Member



ATLAS YELLOWKNIFE PROPOSED PLANT AND SURROUNDING AREA.

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

ALBERTA ENERGY COMPANY LTD.
APPLICATION TO CONSTRUCT WATER EFFLUENT,
AMMONIA, AND NITROGEN PIPELINES

Decision D 86-5
Applications 860109,
860110, and 860111

GOV'T DOCS
APR 3 0 1986

## 1 INTRODUCTION

### 1.1 The Applications

Alberta Energy Company Ltd. (AEC) submitted applications to construct

- approximately 8.1 kilometres (km) of 168.3-millimetre (mm) outside diameter (OD) pipeline to transport water effluent from AEC/Cominco Chemicals and Fertilizers (AEC/Cominco) Joffre Nitrogen Project to the Red Deer River;
- approximately 18.2 km of 168.3-mm OD pipeline to transport liquid anhydrous ammonia (ammonia) from the AEC/Cominco Joffre Nitrogen Project to an off-site storage and loading terminal on the Canadian Pacific Railway (CPR) near Chigwell (Chigwell terminal);
- approximately 11.4 km of 219.1-mm OD pipeline to transport nitrogen from the Union Carbide Prentiss Plant to the AEC/Cominco Joffre Nitrogen Project.

The routes of the applied-for pipelines are shown on the attached figure.

The applicant sponsored an open house at Haynes, on 27 February 1986, for landowners and occupants whose lands would be traversed by the proposed pipelines. The applicant provided information on topics related to the applications and invited the participants to comment on any aspects of them.

### 1.2 Hearing

The applications were considered at a public hearing in Red Deer, Alberta, on 2 April 1986, with G. J. DeSorcy, P.Eng., V. E. Bohme, P.Eng., and T. F. Homeniuk, P.Eng., sitting.

The parties who appeared at the hearing are identified in the following table.

THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Alberta Energy Company Ltd. (AEC)<br>J. W. Beames, Q.C. | R. A. Towler, P.Eng.<br>M. J. Benson<br>L. A. Collins, P.Eng. (Cominco)<br>J. H. Russell, P.Eng. (Canuck GIE Engineering Ltd.) |
| G. Friesen | G. Friesen |
| Preserve Agricultural Land (PAL) | J. W. Hainsworth<br>D. Chessor |
| Alberta Environment<br>R. Dyer | |
| Energy Resources Conservation Board staff<br>A. Gervais<br>A. Cassley, P.Eng.<br>T. J. Pesta, P.Eng. | |

### 1.3 Interventions

Mr. George Friesen intervened to question the need for the proposed ammonia pipeline and the reasons governing the choice of the Chigwell terminal site. The AEC/Cominco Joffre Nitrogen Project is located adjacent to a Canadian National Railway (CNR) line. Mr. Friesen had discussed freight rates with CNR; however, he was not able to obtain information on the tariff offered to AEC/Cominco to transport the produced ammonia. He speculated that CNR's transportation tariffs would be comparable to those offered by CPR.

Mr. Friesen also described the importance of agriculture to the Alberta economy and contended that energy developments impact on agriculture by causing excessively high land values due to the artificial injection of large sums of money for easement purchase. They also result in the use of agricultural land for non-agricultural purposes. Both of these, in Mr. Friesen's view, are detrimental to the long-term interests of the agricultural community.

Mr. Friesen confirmed that he had no specific objection to any of the proposed pipelines but was generally concerned with the impacts on agriculture. He was satisfied that there is a very good probability that agricultural production from the land disturbed during pipeline construction would be indistinguishable from that in adjacent areas within a reasonable time period.

PAL noted that the off-site loading facilities were already approved by the County of Lacombe (County) and so it was likely the pipelines would be approved. It elicited, through questioning, that the County had jurisdiction over Secondary Road 597 and contended that AEC's comments based on the Alberta Department of Transportation expectation of possible future bans on the road should be irrelevant.

## 2 THE APPLICATIONS

### 2.1 Application 860109 - Water Effluent Pipeline

AEC stated that the proposed water effluent pipeline would transport all waste water from the AEC/Cominco Joffre Nitrogen Project treatment facilities and storage ponds to the Red Deer River. AEC noted that the proposed pipeline route incorporates landowner suggestions, and that the pipeline outlet into the river is being designed in consultation with Alberta Environment.

The interveners did not object to the proposed water effluent pipeline.

The Board recognizes the need for the proposed pipeline. It notes that the proposed route is direct and was not opposed by the hearing participants or affected landowners. The Board also finds the pipeline design and construction method satisfactory. It is, therefore, prepared to approve the proposed water effluent pipeline.

### 2.2 Application 860110 - Ammonia Pipeline

AEC gave the following reasons for locating the storage terminal site near Chigwell, adjacent to the CPR, instead of at the AEC/Cominco Joffre Nitrogen Project (on-site terminal) adjacent to the CNR:

- Better access to markets. All destinations for the produced ammonia which are not in the close vicinity are more easily and economically reached through CPR connections. Ammonia would be distributed by trucks to local markets during peak times of ammonia utilization in farming operations. The Chigwell terminal would offer better access to major highways and lower risk of encountering road bans.

- From the proposed Chigwell terminal it would be feasible to transport ammonia by rail to Carseland without switching, which would reduce truck traffic by 12 trucks per day.

- If the Chigwell terminal is used, the impact of truck traffic would be reduced when compared to the impact of truck traffic from an on-site terminal, because the number of trucks would be reduced and the terminal would be closer to a major highway.

- Having regard for the above, the yearly costs for the distribution of ammonia from the proposed Chigwell terminal would be approximately 1.3 million dollars lower than from an on-site terminal.

- The noise of rail-car movements at an on-site terminal could possibly be heard at the hamlet of Joffre, whereas there was only one resident that could possibly be affected near the Chigwell terminal.

- The proposed Chigwell terminal would occupy less agricultural land than an on-site terminal. It would be located farther from population centres and have lower noise impact. Therefore, AEC concluded that there would likely be an overall lower environmental impact than for an on-site terminal.

AEC stated that the proposed ammonia pipeline was designed to exceed the applicable standards and regulations. It noted that extensive expertise available from existing ammonia pipelines in the United States of America (U.S.A.) was utilized during the design of the pipeline and would be applied during its construction and operation. The separation distance between the proposed ammonia pipeline and existing residences would be in excess of the minimum separation distance suggested by "Guidelines for the Location of Bulk Ammonia Storage Facilities" published by Alberta Environment. AEC pointed out that the closest residence would be some 400 metres from the proposed ammonia pipeline.

AEC stated that a leak detection system would be installed on the proposed ammonia pipeline. Emergency equipment would be available and personnel would be trained to handle any emergencies quickly and effectively. AEC stated that it does not expect that a pipeline leak would result in dangerous concentrations of ammonia at the nearest residences. However, it would prepare an emergency response plan for the plant and the proposed pipeline.

AEC stressed that during the operating history of more than 4600 km of ammonia pipelines in the U.S.A. there have not been any serious accidents. The accidents that did occur were generally caused by third-party damage. AEC stated that the risk of third-party damage to the proposed pipeline is very low because it would cross only agricultural land and, because of the low design operating stress level, the probability of a rupture is also very low.

The interveners questioned the validity of the applicant's transportation costs that were used to compare the Chigwell terminal to an on-site terminal. However, they presented no cost comparison of their own.

Mr. Friesen expressed concern about the possibility of a second pipeline adjacent to the proposed ammonia pipeline. He claimed that the easement document presented by AEC contained a clause allowing for this, although AEC stated it had no such plans at this time.

The Board is satisfied with the reasons submitted for locating the storage terminal facility on CPR trackage. It believes that the dollar savings would pay back expenditures for the proposed ammonia pipeline and storage facility within a reasonable time period. However, the direct economic benefits must be weighed against the potential negative impacts that the proposed ammonia pipeline could have on individuals or upon the broad public interest.

The Board has reviewed the proposed pipeline design and is satisfied with it. It is also satisfied that the proposed method of construction would minimize land disturbance. The Board notes that the proposed route is direct and that consideration had been given to separation distances between the pipeline and residences and to landowner routing suggestions. The Board is therefore satisfied that the proposed route would minimize impacts on agriculture and the environment and that any such impacts would be short term. The Board also notes that there were no objections to the proposed ammonia pipeline routing.

The Board believes that the impacts on the public from the Chigwell terminal would not be substantial and that its relative remoteness would avoid noise impacts. The Board accepts that the impact of the truck traffic from the Chigwell terminal would be lower than from an on-site terminal. The Board also notes that the Chigwell terminal would utilize less agricultural land.

The Board recognizes that a relatively longer ammonia pipeline to an off-site loading terminal would increase the risk of an ammonia release when compared to an on-site terminal. On the other hand, utilization of the Chigwell terminal would reduce truck traffic, thereby reducing the possibility of an accidental ammonia release from a tank truck. Furthermore, the Board agrees that the design and extra operating precautions would reduce the risk of a pipeline leak to a very low level. The Board notes AEC's commitment to personnel training and the preparation of a comprehensive emergency response plan. If the application is approved, it would require that a copy of the emergency response plan be filed with its Red Deer area office.

The Board believes that it would be in the public interest that AEC/Cominco have the capability of shipping product to markets at the lowest available transportation cost. The Board is satisfied that the negative impacts of the pipeline would be minor and acceptable. Accordingly, the Board believes that the proposed ammonia pipeline is justified in terms of public interest and is prepared to approve it.

The Board has the following comments respecting Mr. Friesen's contention that a second line is being planned. Under section 7 of the Pipeline Act, the applicant would require a permit to construct a second pipeline within an existing easement. Additionally, Board Interim Directive ID 85-2 requires that an applicant confirm that the landowner or occupant has no objection to a second pipeline and the new construction, before a permit can be issued. This requirement and AEC's statement that it plans no second pipeline satisfies the Board respecting this issue.

### 2.3 Application 860111 - Nitrogen Pipeline

AEC stated that the proposed pipeline is required to transport the necessary quantities of nitrogen feedstock from the existing Union Carbide Prentiss Plant to the AEC/Cominco Joffre Nitrogen Project.

AEC investigated the feasibility of an alternate route adjacent to the CNR. This route would be shorter in length; however, it would conflict with the hamlet of Joffre, would encounter a number of road crossings at an oblique angle, and would encounter some low, wet land. All of these could result in increased costs. Additionally, the proposed route is common to the proposed ammonia pipeline route for one-half its length, and thus costs and impacts would be reduced.

The Board recognizes the need for the proposed nitrogen pipeline. It notes that none of the interveners objected to it. Considering that the Board is prepared to approve the ammonia pipeline, it follows that the proposed nitrogen pipeline route would save costs and have lower environmental and agricultural impacts by placing the line in the same ditch as the ammonia pipeline. The Board is satisfied with the proposed route, the design, and the proposed construction method, and is therefore prepared to approve the application.

## 3 DECISION

Having regard for its conclusions that the proposed pipelines are necessary, that the routes are satisfactory, and that the impacts of the pipelines and off-site terminal would be acceptable, the Board is prepared to issue the requested pipeline permits subject to the approval of the Minister of the Environment respecting environmental matters. The permit for the ammonia pipeline will be issued on the understanding that the permittee will complete its emergency response plan in a manner satisfactory to the Board and file one copy with the Board's Red Deer area office prior to filling the pipeline with ammonia.

Industrial Development Permit No. AEC 85-1 issued to AEC/Cominco authorizes the use of hydrogen and natural gas for the production of ammonia. In keeping with Board Decision D 85-39, the permit reflects on-site storage and loading facilities. AEC/Cominco stated that these facilities will not be constructed at this time. The Board will not amend the Industrial Development Permit No. AEC 85-1 to reflect this modification, on the understanding that AEC/Cominco will advise the Board if it decides to proceed with the on-site facility.

DATED at Calgary, Alberta, on 18 April 1986.

ENERGY RESOURCES CONSERVATION BOARD

GJ DeSorcy

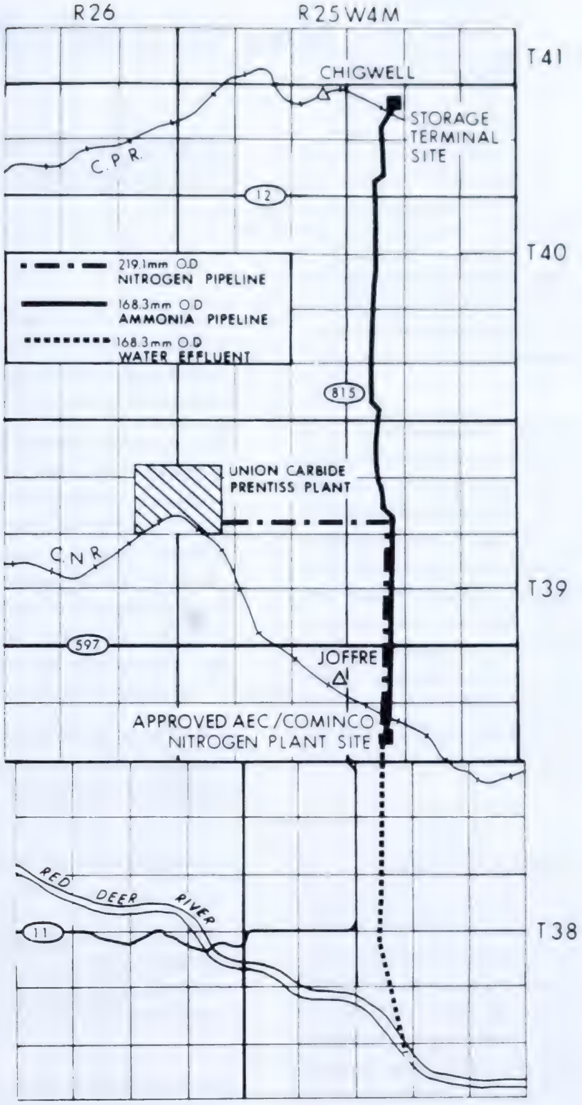
G. J. DeSorcy, P.Eng.
Vice Chairman

VE Bohme

V. E. Bohme, P.Eng.
Board Member

T Homeniuk

T. F. Homeniuk, P.Eng.
Acting Board Member


R26
R25W4M
T41
T40
T39
T38
CHIGWELL
STORAGE TERMINAL SITE
C.P.R.
12
219.1mm O.D NITROGEN PIPELINE
168.3mm O.D AMMONIA PIPELINE
168.3mm O.D WATER EFFLUENT
815
UNION CARBIDE PRENTISS PLANT
C.N.R
597
JOFFRE
APPROVED AEC/COMINCO NITROGEN PLANT SITE
RED DEER RIVER
11

PIPELINES IN THE JOFFRE AREA APPLIED FOR BY ALBERTA ENERGY COMPANY LTD. APPLICATIONS NO. 860109, 860110 AND 860111

D86-5
ERCB

## ENERGY RESOURCES CONSERVATION BOARD

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# ESSO RESOURCES CANADA LIMITED COLD LAKE PRODUCTION PROJECT PHASES 7 TO 10

**Decision D 86-6**
**Application 851395**

## 1 APPLICATION

Esso Resources Canada Limited (Esso) applied on 6 December 1985, in accordance with clause 2(3) of Board Approval No. 3950, for approval of specific technical details of Phases 7 to 10 of its Cold Lake Project.

Approval No. 3950, issued in September 1983, permitted the phased development of the Cold Lake Production Project (CLPP) and the eventual production of up to 25 400 thousand cubic metres per day ($m^3/d$) of crude bitumen from the development area shown in Figure 1. By development in modular phases of 1500 $m^3/d$ per phase, the project would be fully developed in some 18 phases. At present, specific approval has been granted for the project's first six phases and the production of up to 9000 $m^3/d$ of crude bitumen.

Phases 7 to 10 would produce 6000 $m^3/d$ of crude bitumen from 14.25 sections of land located adjacent to the existing six phases and within the CLPP development area.

Details of the four-phase expansion are summarized as follows:

- 420 wells to be directionally drilled in 21 clusters each of 20 wells on traditional 1.6-hectare spacing, and 160 wells in 4 clusters each of 40 wells, to evaluate the potential for improved efficiency using 0.9-hectare spacing.
- The 6000 $m^3/d$ production level to be maintained over the project life by drilling about 80 additional wells per year within the Phases 7 to 10 area.
- Central plant facilities to be constructed adjacent to the central facilities for Phases 3 and 4.
- Total fresh make-up water requirements during steady-state operating conditions to be met within the limits of existing water withdrawal licences from Cold Lake and Ethel Lake as reflected in Figure 2 attached.
- Start-up period requirements for additional volumes of fresh water to be obtained from a groundwater well system on the basis of a permit of a 3.5-year term issued by Alberta Environment.
- Additional bitumen transportation diluent requirements of 2800 $m^3/d$.
- Initial on-site construction to require a peak number of 800 to 900 workers, production operations work force to be expanded by 130 permanent jobs, on-going construction and maintenance to generate 160 jobs.

Esso presented and discussed the details of the expansion proposal in a number of meetings with local community groups, individuals, businesses, and government agencies. This public communication program assisted in identifying, addressing, and resolving most local concerns related to the project. Esso also met with the Metis Association of Alberta to discuss employment practices and advised that discussions would continue as required. Esso reported overall public support at both local and provincial levels. However, one landowner filed several concerns with the Energy Resources Conservation Board (Board) and these are addressed in a later section of this report.

## 2 SPECIFIC DETAILS

The Board has reviewed the details of the Phases 7 to 10 expansion. It finds that the development plans are similar to those of the initial six phases and conform to the provisions of Approval No. 3950. Changes proposed in the design and operation of the four-phase expansion relate to site-specific geological features of the oil sands formation and refinements of operating strategies which reflect experience gained from the construction and initial operation of earlier phases. The Board concludes that the program to implement the next four phases is sound and orderly.

Notwithstanding this, the Board has identified the following issues of public interest and comments on these matters in subsequent passages.

- Make-up fuel source.
- Additional fresh water make-up volumes required during the start-up period.
- Property liens.
- General environmental concerns.
- Project cost/benefit analysis.

## 3 MAKE-UP FUEL SOURCE

In its assessment of alternate make-up fuels for use at Phases 7 to 10, Esso re-examined previous analyses that it had undertaken in 1978 and 1979 which compared natural gas, coal, and desulphurized gas oil as potential fuels for steam generation at the proposed Cold Lake integrated bitumen production and upgrading mega-project. In its updated evaluation, Esso looked at the technological and economic aspects of using either natural gas or coal specifically for Phases 7 to 10.

A major technical concern identified was the lack of industry experience in the design, construction, and operation of large coal-fired steam generators required for commercial oil sands projects. Esso felt that the only way to alleviate this concern would be to test fluidized bed combustion, at a capacity of about 350 gigajoules per hour, on a pilot scale basis. It further stated that the time period required to resolve potential operating problems and to engineer and construct commercial scale fluidized bed combustors would delay the start-up of Phases 7 to 10 by at least 2 years.

From a technical standpoint, Esso concluded that natural gas continued to hold advantages over coal for steam raising purposes due to greater operating flexibility, minimum operating complexity, a higher operating service factor, higher energy efficiency, and lower environmental impacts.

From an economic standpoint, Esso projected that the net social cost of using coal in place of natural gas for Phases 7 to 10 would be $200 million (1985 $) using a 10 per cent real discount rate. Its analysis included the proposed pilot testing of fluidized bed combustors.

In a submission to the Board, Fording Coal Limited (Fording) recommended that research and development of suitable coal-fired steam generators be actively pursued and a schedule of 2 to 5 years be established to reach proper technical and economic decisions. It suggested that coal-fired steam generators be implemented only when technology has been proven and costs become competitive. Fording believed that efforts should be directed to develop and evaluate the best technology which may include other processes such as pulverized-coal boilers. It recommended the initiation of a jointly directed and funded research program by government, oil and coal industries, designers and manufacturers which would involve the operation of a pilot plant should a feasible technology be found.

In 1980, the Board considered natural gas versus coal as alternate make-up fuels for Esso's integrated mega-project and presented its findings in ERCB Decision 81-C. Based on a comparison of the relative merits of each fuel and in light of relatively low project make-up fuel requirements, the Board approved the use of natural gas. The Board conditioned its approval such that if offsite make-up fuel requirements were to exceed 50 terajoules per calendar day—the equivalent of 18 billion cubic feet per year of natural gas—Esso would be required to review the matter of alternate fuels and report to the Board. This requirement was based upon an expectation of future premium value of natural gas and emerging economic attractiveness of coal, including advantages of scale as the total make-up fuel requirements of the project expanded.

The Board has reviewed the economic aspects of natural gas versus coal as alternate fuels for Phases 7 to 10, bearing in mind the Board's previous decision respecting the integrated mega-project but with primary regard for the current phased, non-integrated development approach. The Board finds that the make-up fuel requirements for Phases 7 to 10 are relatively small and since there have been no significant changes in the technology related to coal-fired boilers in the interim period following its 1981 decision, the economic advantage, although slight, currently rests with natural gas as the fuel source for the project.

Respecting the technology for coal use, the Board notes that large-scale coal-fired steam generation units are widely used for electric power generation. However, these kinds of units may not have the operating flexibility desired for modular in situ oil sands projects. Nevertheless, the Board agrees with Esso and Fording that the desired technology could be demonstrated and acceptable operating reliability be confirmed through further development and adaptations of existing techniques and equipment used for utility power generation. The Board concurs with Esso that pilot testing of coal-fired steam generators should be undertaken prior to use in a commercial project.

Respecting the economic outlook, the Board feels that the relative economics of natural gas versus coal as the fuel source for oil sands in situ operations in Alberta will, at some point in the future, tend to favour coal over natural gas. Supply, prices, and other industrial and domestic user preferences for natural gas point toward that possibility. The Board therefore concludes that it would be in the public interest for steps to be taken now to ensure that technological developments for coal utilization be actively pursued.

In conclusion, the Board endorses Fording's proposal of active research and development of suitable technology, and recommends that government research bodies (including the Alberta Office of Coal Research and Technology (AOCRT), AOSTRA, CANMET) and private sector interests (coal and oil sands) initiate coal-use technology demonstration programs with the necessary funding assistance.

## 4 ADDITIONAL FRESH MAKE-UP WATER REQUIRED DURING START-UP PERIOD

Esso contended that the overall steady-state water requirements of the first 10 phases of CLPP plus the Leming and May-Ethel experimental pilot projects can be met through a combination of recycled produced water and the fresh water volumes currently approved for withdrawal from Cold Lake and Ethel Lake. During steady-state operations, recycled produced water would, as illustrated in the attached Figure 2, provide 70 per cent of the project water requirements.

The produced water handling system at Cold Lake includes water recycle plants designed to recycle up to 100 per cent of produced water, tank farms for temporary storage of surplus produced water, and water transfer pipelines interconnected to each recycle plant to allow optimization of produced water supply/demand allocations.

Esso indicated that provisions of licences issued under the Water Resources Act permit a maximum withdrawal of 19 725 $m^3$/d of fresh surface water: 17 808 $m^3$/d from Cold Lake and 1917 $m^3$/d from Ethel Lake.

The start-up period of Phases 7 to 10 would require an additional volume of up to 4000 $m^3$/d of additional fresh water over a 12-month period to supplement existing licence limits. For this purpose, Esso has obtained a Temporary Permit of a 3.5-year term from the Controller of Water Resources for the use of up to 1.4 million cubic metres of water from a groundwater well system located in SW 1/4-22-65-4 W4.

A water supply pipeline from the North Saskatchewan River with a holding reservoir near Tucker Lake has been proposed under Alberta Environment's Long Term Water Management Plan for the Cold Lake-Beaver River region. The objective is for the pipeline to be operational by about 1991. Esso proposes to then change its source of fresh water for Cold Lake operations to be consistent with the Long Term Water Management Plan.

The Board notes that the permit issued by Alberta Environment reflects the tenor of careful attention to the use of fresh water sources. It also notes that the Temporary Permit requires the monitoring of any effects of withdrawal on the aquifer and on other groundwater users through a number of observation well points during and following water withdrawal operations. The Board is satisfied that Esso's proposed temporary use of groundwater is within the spirit of careful water use planning.

## 5 PROPERTY LIENS

A local landowner, Mr. Robert Strayer, filed a submission with the Board concerning builders' liens which had been filed against property surface rights. He submitted that the liens were filed by subcontractors against contractors involving construction of CLPP and that he was having difficulty changing the liens from his surface rights to the mineral rights of the property. Mr. Strayer subsequently advised the Board that the liens had been removed from his surface land title, but he was concerned that improper filing could continue and new liens would re-initiate the problem. He also wanted to voice his concerns so that other landowners in the area would become aware of the potential problems of property liens.

Esso advised of its assistance to affected landowners through efforts with contractors, subcontractors, and their legal representatives to have existing liens removed from property surface rights and ensure new liens are properly filed against the mineral rights. Esso also advised that it had discussed, with the Department of Energy and Natural Resources, changes to the process of registering liens against oil and gas rights to better utilize the Mines and Minerals Registry.

The matter of builders' liens is not within the Board's jurisdiction and thus the Board is not in a position to initiate action to resolve the problem cited by Mr. Strayer. Moreover, the Board is aware that builders' liens are adjudicated by the Courts. However, the Board recognizes that the problem could continue and new liens might be improperly filed against landowners' surface titles. In an extreme case this could be a serious impairment to the public as well as private interests if it were to cause extended delays to a project. Therefore, if it becomes apparent that the present builders' lien legislation is creating such problems, the Board would ensure that the matter is brought to the attention of the responsible government authorities.

## 6 GENERAL ENVIRONMENTAL CONCERNS

Mr. Strayer was concerned about the possibility of contamination and injury to waterfowl who may land on lime sludge and landfill containment ponds. As well, he was concerned about the potential for adverse effects on the water quality of Jackfish Creek and Borque Lake arising from the proximity of surface facilities. Mr. Strayer also questioned the cumulative effects of the combined oil sands development in the general Cold Lake area on air quality.

Esso met with Mr. Strayer to address the concerns he raised. Esso advised that pond water contains no oil or hazardous chemicals and has a salt content less than that of sea water. Esso also pointed out that oily wastes are stored in concrete pits at the project sites and tend not to attract birds due to the solid nature of wastes.

Regarding the proximity of facilities to water bodies, Esso advised that Land Surface Conservation Guidelines were used in establishing facility setbacks and additional preventative measures were taken in specific cases in consultation with Alberta Environment and Forestry representatives. In some cases this has resulted in shifting of drilling cluster pads.

In response to air quality concerns, Esso submitted that total sulphur dioxide emissions from the 10 phases of the project would amount to only about 10 per cent of that which had been approved for the integrated mega-project. It noted that existing monitoring programs would be continued so as to ensure compliance with air quality standards. As well, it mentioned that discussions had been initiated with other industries in the Cold Lake region to establish an integrated air quality monitoring network.

Esso stated that it would continue to monitor these environmental matters and take preventative measures should problems arise.

The Board finds that the environmental impact of the first 10 phases of the Esso Cold Lake Phased Project is below that which had previously been found acceptable for the integrated mega-project. It notes that Esso has an on-going environmental monitoring program which ensures compliance with the Clean Air and the Clean Water Acts. The monitoring program would be expanded to include the addition of Phases 7 to 10. The Board also notes that, similar to existing phases, a Development and Reclamation Plan for the four-phase expansion will be filed with Alberta Environment to ensure sound land reclamation planning, and that evaluation of the plan involves scrutiny and advice from several government departments, including the departments of Forestry, Fish and Wildlife, and Recreation and Parks.

## 7 PROJECT COST/BENEFIT ANALYSIS

Esso initially proposed to begin construction of Phases 7 to 10 by mid 1986 and scheduled the start-up of steam injection operations for the first quarter of 1988. It provided a cost/benefit analysis of the project based on an April 1985 forecast of crude oil and natural gas prices. The project was seen to provide a net social benefit of $790 million (1985 $), at a 10 per cent real discount rate.

Esso anticipated that the construction stage would require 800 to 900 workers at its peak. Construction of the central plant and field facilities was expected to contribute a total of 1375 worker-years of employment to the local area. As well, the permanent work force at Cold Lake would be expanded by 130 and on-going construction and maintenance would require about 160 contract employees.

International oil prices have fallen dramatically during the period following the December 1985 submission of the Phases 7 to 10 application to the Board. The original economic prospects of the project have been directly affected and expectations have lessened. Esso has therefore reassessed its development time schedule and now plans to limit activity to detailed engineering design during 1986, and delay the start of construction by at least one year.

The Board is satisfied with the technical merits and environmental matters respecting the expansion proposal. Also, the Board recognizes that completion of detailed project engineering would assist rapid project go-ahead when a more viable oil price situation develops. In those respects the Board sees no reason to not grant the application unconditionally.

At the same time, while the Board can appreciate the difficulties in making firm commitments to project construction caused by the deepening uncertainties respecting future oil prices, it is of the view that orderly and efficient development of the oil sands cannot be assured without firm commitments to timely development by project sponsors. Additionally, application of most suitable technology and the terms for assessing the optimum public interest often change as time passes.

Keeping these foregoing factors in mind, the Board considers it desirable to grant approval for Phases 7 to 10 but also to introduce a lapse date in the approval for those phases. The Board considers a lapse period of about 3 years, up to 31 December 1989, suitable for that purpose, after which the approval of Phases 7 to 10 would be cancelled if project construction had not commenced or the operator had not received approval to extend the date on the basis of evidence respecting circumstances existing at that time.

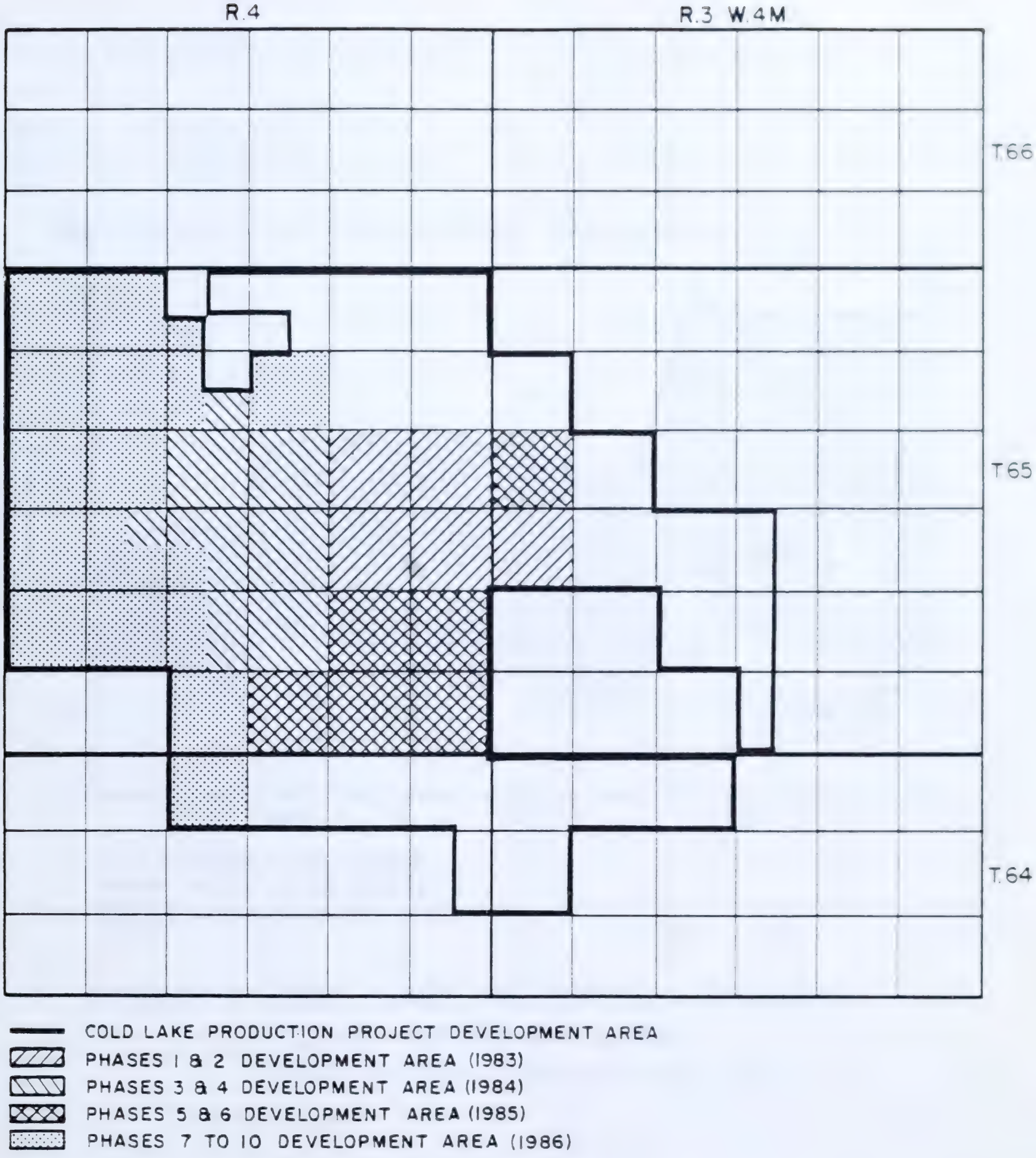
## 8 DECISION

Having reviewed the details of Phases 7 to 10 and having regard for the potential impacts and public benefits, the Board is prepared, with the authorization of the Lieutenant Governor in Council, to approve CLPP Phases 7 to 10 with provision for cancellation if construction has not commenced by 31 December 1989.

DATED at Calgary, Alberta, on 16 July 1986.

ENERGY RESOURCES CONSERVATION BOARD

N. A. Strom, P.Eng.
Board Member


R.4
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T.66
T.65
T.64
COLD LAKE PRODUCTION PROJECT DEVELOPMENT AREA
▨ PHASES 1 & 2 DEVELOPMENT AREA (1983)
▧ PHASES 3 & 4 DEVELOPMENT AREA (1984)
▩ PHASES 5 & 6 DEVELOPMENT AREA (1985)
░ PHASES 7 TO 10 DEVELOPMENT AREA (1986)

FIGURE 1 COLD LAKE PRODUCTION PROJECT DEVELOPMENT AREA.

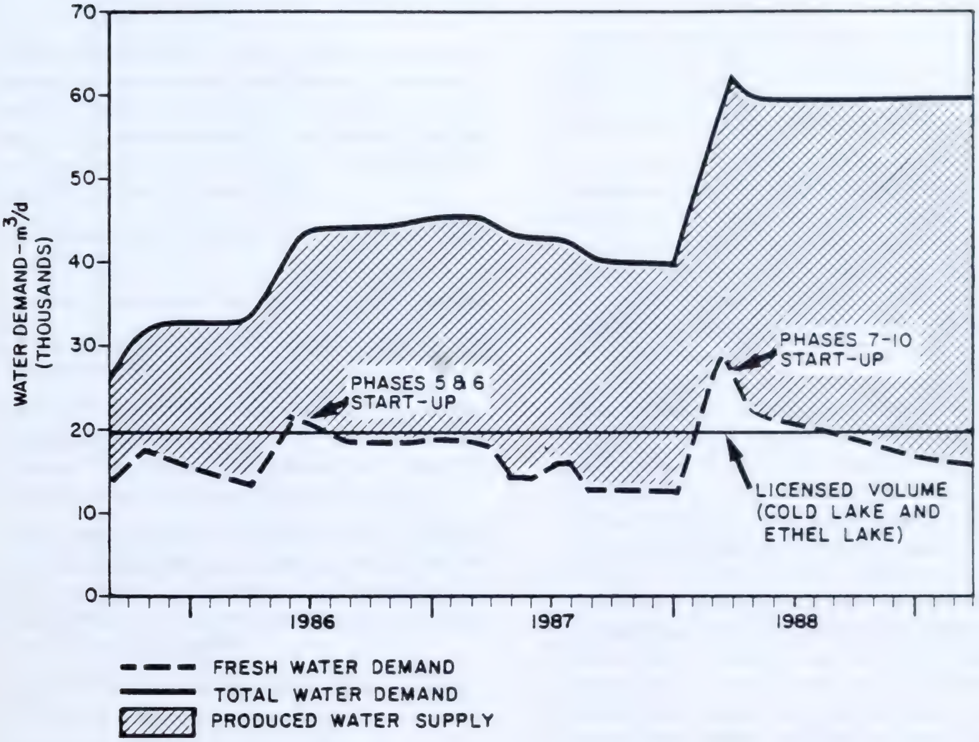

FIGURE 2 COLD LAKE PRODUCTION PROJECT
TOTAL WATER BALANCE
(ADOPTED FROM APPLICANT'S DRAWING)

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# ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

# APPLICATION FOR GAS REMOVAL PERMIT SHELL CANADA LIMITED

**Decision D 86-7**
**Application 860172**

## 1 APPLICATION

Shell Canada Limited (Shell) applied to the Energy Resources Conservation Board (Board), pursuant to section 2 of the Gas Resources Preservation Act (the Act), for a permit authorizing the removal of natural gas from the Province of Alberta. Shell requested a permit which would provide for

- the removal of 7420 million cubic metres ($10^6$ $m^3$) of gas in total,
- the maximum annual removal of 720 x $10^6$ $m^3$ of gas,
- the maximum daily removal of 1980 thousand cubic metres of gas,
- delivery of up to 12 per cent in excess of the specified maximum daily volumes, on a daily basis, to overcome temporary operating problems and errors in measurement and unaccountable losses,
- the removal of gas not removed during a particular annual period during any of the next annual periods, all periods within the term of the permit and all removals subject to maximum annual and daily limitations in the permit,
- a permit term extending from 1 November 1987 to 31 March 1999, and
- the naming of certain fields, pools, and areas from which gas may be obtained for removal from the province.

Shell requested the permit for the purpose of supplying gas to Granite State Gas Transmission, Inc. (Granite State) of Canton, Massachusetts, U.S.A. The gas would be sold by Granite State through its affiliated companies, Bay State Gas Company (Bay State) of Canton, Massachusetts, and Northern Utilities Inc. (Northern), also of Canton, Massachusetts, for distribution in the states of Maine, New Hampshire, and Massachusetts. All of the gas would be obtained from reserves owned by Shell in the Province of Alberta.

The gas would be transported to Empress, Alberta, by NOVA, AN ALBERTA CORPORATION, and from Empress to Niagara Falls, Ontario, and Sabrevois, Quebec, by TransCanada PipeLines Limited (TransCanada). Approximately 1.0 million cubic metres per day would flow through the Niagara Falls export point into the system of Tennessee Gas Pipeline Company for delivery to Bay State's service territory at Springfield, Massachusetts. The gas would be used for Bay State's system supply, which includes industrial customers such as the Massachusetts Municipal Wholesale Electrical Company.

The proposal to supply Bay State's system in the Springfield area represents a change to Shell's original application, in which a similar volume was requested to supply an electrical power generation plant in the Portland, Maine, area. Although the total volume applied for remains unchanged, only 700 thousand cubic metres per day would flow through the system of Gaz Metropolitain, inc. (GMi) from Sabrevois to a new interconnection with the system of Montreal PipeLine Limited (MPL) near Brigham, Quebec. Shell Canada Products Limited (SCPL), a wholly owned subsidiary of Shell, would transport these volumes from Brigham to the Canada/U.S. boundary near Highwater, Quebec, using one of the MPL oil pipelines which it would lease and convert to natural gas service. Subject to approval by U.S. regulatory authorities, Granite State would similarly lease one of the connecting Portland Pipe Line Corporation (PPL) oil lines between North Troy, Vermont, and Portland, Maine, and convert it to natural gas service. At Portland the gas would enter the Bay State and Northern systems for sale to their customers in Maine, New Hampshire, and Massachusetts.

## 2 HEARING

On 28 April 1986, the Board convened a public hearing of the application at its offices in Calgary, Alberta, with G. J. DeSorcy, P.Eng., N. A. Strom, P.Eng., and L. A. Bellows, P.Eng., sitting. Western Gas Marketing Ltd. intervened for the purpose of examining witnesses and advancing argument, but did not in fact examine witnesses or advance argument.

## 3 VIEWS OF SHELL

Shell stated that the proposed sale of gas to Granite State would result in direct economic benefits to Alberta, and that the gas purchased from Shell would have no effect on Granite State's purchases of Canadian gas through the Boundary Gas Project. Shell also stated that the sale to Granite State would develop an area of market potential for Alberta gas by the attachment of new residential, commercial, and industrial customers in existing and new service areas. The applicant presented statistics to demonstrate that since 1983, natural gas sales have increased substantially in the proposed market area. Based on these statistics, Shell expects that volumes delivered under the permit would be at high load factors.

Pricing of the gas would be competitive with alternative energy available in the market area. The price would be adjusted monthly to track changes in prices of competing fuels, subject to the minimum adjacent border price as determined by the Government of Canada. Shell indicated that currently, the minimum adjacent price would be $3.09 U.S. per million Btus, while the price of competing fuels would be $2.27 U.S. per million Btus. The sales contract does not contain a guarantee that the gas would be taken but does provide for a minimum monthly demand charge which would cover all fixed charges of the transportation system.

With regard to reserves intended to supply the Granite State market, Shell stated that six new wells had been successfully completed in the fields and areas listed in its application, adding substantially to both reserves and deliverability available. Shell also stated that its calculation of Alberta's gas surplus position had been made using data published some years ago, and noted that the Board has the discretionary power to assess its application favourably under the current supply/demand situation.

## 4 VIEWS OF THE BOARD

The Board believes that Shell has sufficient gas reserves to supply the removal volumes applied for, and that the proposal represents a new and viable market for Alberta gas. The Board notes the high load-factor delivery expectations of the applicant for the requested term of the permit. With the existing marketing situation, there is no way to accurately forecast future patterns. However, the Board believes there is a reasonable likelihood that the gas will be delivered as predicted by Shell. The existence of the minimum demand charge would be an incentive to move the gas.

The sales contract pricing provisions appear reasonable and the price would be responsive to market conditions. It would also be subject to Federal controls.

Having regard for all of these matters, the Board believes the proposed sale of gas would be in the public interest of Alberta. The Board also notes that there were no interventions challenging this aspect of the public interest, nor indeed, any part of the application.

Turning next to the matter of the present and future needs of persons in Alberta, the Board notes that Shell submitted a surplus calculation, using the Board's current calculation methods, which showed that the gas would be surplus to Alberta's needs. Much of the data used was several years out of date because the Board has not recently published an appraisal of the gas surplus situation. The last detailed appraisal was in ERCB Report D 83-B[1] which reflected reserves and requirements as of mid-1982. In that report the Board indicated that it was prepared to commit all of the then surplus gas to six applicants that were requesting removal permits. Permits to those applicants have since been issued.

The Board, in assessing the Shell application, has decided that it will not make a detailed assessment of the surplus situation. The reasons for this are as follows:

- the formulae and procedures to be used in the surplus calculation will be reviewed, at the request of the Government, at an ERCB hearing scheduled for Calgary on 24 June 1986, and
- the permits dealt with in ERCB Report D 83-B and referred to in the preceding paragraph are currently under review by the ERCB to determine if the very substantial volumes of gas covered by them will likely be removed during the permit terms.

These matters are so significant that they would likely render meaningless any surplus calculation carried out at this time.

The Board considered the possibility of deferring the Shell application until after the results of the 24 June hearing and the permit reviews were available. It decided, however, that this would not be necessary and concluded that approval of the application would not place at risk the present and future needs of persons in Alberta. The reasons for proceeding at this time and for the Board's conclusion that the gas is surplus are as follows:

- Shell and its U.S. customer indicated that a timely decision on the removal of the gas from Alberta was critical to the ongoing regulatory steps and other efforts needed to finalize the project. A delay in the Alberta decision until the results of the June hearing and permit reviews are available would likely kill the project.

---

[1] ERCB Report D 83-B, Gas Removal Permit Applications Decisions, February 1983.

- The volume requested by Shell is relatively small and amounts to less than 0.4 per cent of the remaining reserves of the province.
- Not all of the existing permits to remove gas from Alberta are being fully utilized and the Board has jurisdiction to review such permits if the need arises. (As indicated earlier, the Board is in fact currently reviewing a number of permits.)
- There is a very large volume of gas in Alberta which is shut in due to lack of markets.
- Most removal permits contain clauses that require, subject to certain limitations, the permit holders to supply gas to users within the province where the gas is required and can be reasonably supplied.
- The Gas Resources Preservation Act allows for a diversion, under certain conditions, of certain gas intended for removal from the province, in order to ensure an adequate supply for consumers in Alberta.

Shell requested that its permit have a term of some 11.5 years to 31 March 1999. As indicated previously, it is impossible to foresee what energy marketing patterns will be that far into the future. However, in the Board's opinion, the concept of entering into some reasonably long-term arrangements with established marketers of gas in appropriate parts of North America is a sound approach in terms of the Alberta public interest. For this reason, and because the permit could be reviewed if it were not properly utilized, the Board is satisfied that the requested term is reasonable.

## 5 DECISION

Having regard to the evidence presented, and to the conclusions set out in the previous section of this report, the Board is satisfied that the granting of the gas removal permit requested by Shell would be in the public interest of Alberta. The Board is therefore prepared, with the approval of the Lieutenant Governor in Council, to issue the requested permit. It would be in the form shown in Appendix A and would be subject to the terms and conditions contained therein, as well as any conditions imposed by the Lieutenant Governor in Council.

DATED at Calgary, Alberta, on 20 May 1986.

ENERGY RESOURCES CONSERVATION BOARD

G J DeSorcy

G. J. DeSorcy, P.Eng.
Vice Chairman

N. A. Strom, P.Eng.
Board Member

L A Bellows

L. A. Bellows, P.Eng.
Board Member

FORM OF PERMIT*

# THE PROVINCE OF ALBERTA

## GAS RESOURCES PRESERVATION ACT

## ENERGY RESOURCES CONSERVATION BOARD

IN THE MATTER of a permit to
Shell Canada Limited
authorizing the removal of gas
from the Province

## PERMIT NO. GR 86-46

WHEREAS Shell Canada Limited has applied to the Energy Resources Conservation Board for a permit, pursuant to the Gas Resources Preservation Act, being chapter G-3.1 of the Statutes of Alberta, 1984, authorizing the removal of gas from the Province; and

WHEREAS the Board, upon inquiry into and hearing of the application, is of the opinion that the provisions of the Act affecting the application have been complied with and that the granting of the application is in the public interest having regard to those matters set forth in section 5(3) of the Act; and

WHEREAS the Lieutenant Governor in Council, by Order in Council numbered O.C. / and dated , has authorized the granting of the permit.

THEREFORE, the Energy Resources Conservation Board, pursuant to the Gas Resources Preservation Act, being chapter G-3.1 of the Statutes of Alberta, 1984, hereby orders as follows:

1. The application of Shell Canada Limited (hereinafter called "the Permittee") for removal of gas from the Province, is approved, subject to the terms and conditions herein contained.

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* This is only a form of permit. The permit, when issued, may have minor variations from that set out here.

2. Gas shall be removed from the Province pursuant to this permit in accordance with Application No. 860172 from the Permittee to the Board dated 3 February 1986, as amended.

3. This permit shall be operative for a term commencing on 1 November 1987 and ending on 31 March 1999.

4. The quantity of gas that may be removed from the Province pursuant to this permit shall not exceed

(a) during the term of the permit, a total of 7 420 000 000 cubic metres, nor

(b) during any consecutive 24-hour period or any consecutive 12-month period ending 31 October, rates limited by field productivity and good engineering practice, but in a 24-hour period such rates shall not exceed 1 980 000 cubic metres and in a 12-month period such rates shall not exceed 720 000 000 cubic metres.

5. Notwithstanding clause 4, subclause (b), the Permittee, for the purposes only of alleviating temporary operating problems caused by pipeline or equipment failure, may remove in any consecutive 24-hour period an additional 10 per cent of the volume of gas authorized for such period by clause 4, subclause (b), and for the purposes only of allowing for measurement errors and unaccountable losses, may remove in any consecutive 24-hour period an additional 2 per cent of the volume of gas authorized for such period by clause 4, subclause (b).

6. (1) The Permittee may remove or cause to be removed from the Province under the authority of this permit, only gas produced from the following pools, fields and areas:

Cranberry
Gordondale
Hamburg
Panther River
Pouce Coupe South
Progress
Waterton

(2) Each pool, field or area named in clause 6, subclause (1) of this permit shall be construed as being the pool, field or area of the same name, as such pool, field or area may be designated from time to time by the Board, pursuant to the Oil and Gas Conservation Act.

(3) Where any pool, field or area named in this permit is revised or designated by the Board in a manner otherwise than by the name referred to herein, the Board may, by stipulation hereto, substitute the revised name designated for any such pool, field or area named in this permit.

7. The Permittee shall remove or cause to be removed only such gas as is transported on behalf of the Permittee through Section 9 of Township 20, Range 1, West of the 4th Meridian, for delivery from the facilities of NOVA, AN ALBERTA CORPORATION to the pipelines of TransCanada PipeLines Limited.

8. (1) All gas removed from the Province pursuant to this permit shall be measured by or on behalf of the Permittee by meters approved by the Board.

(2) The relative density, higher heating value and volume of all gas received by the Permittee through the facilities referred to in clause 7 shall be measured and reported in a manner approved by the Board, by or on behalf of the Permittee, at or near the point at which gas is delivered by the said facilities.

9. Notwithstanding any provisions of any contract for the purchase or other acquisition of gas, the Board may require the extraction of any substance or substances except methane from any gas before its removal from the Province pursuant to this permit.

10. All quantities of gas for the purpose of this permit shall be referred to a 101.325 kilopascal pressure base and a 15° Celsius temperature base.

11. The Permittee shall supply gas from the pipeline of NOVA, AN ALBERTA CORPORATION at a reasonable price to any community or consumer within the Province, or to any public utility requiring gas for such community or consumer that is willing to take delivery of gas at a point on the pipeline transmitting the gas, and that, in the opinion of the Board, can reasonably be so supplied by the Permittee.

12. If any community, consumer or public utility is willing to take delivery of gas pursuant to clause 11 and agreement on the price to be paid for the gas cannot be reached, the price to be paid shall be determined by the Public Utilities Board on the application of an interested party, and the part of the price attributable to transportation shall be based on the assumption that the gas has been supplied from the capable source or sources available to the Permittee nearest to the point of delivery.

13. Notwithstanding the provisions hereof, the Permittee shall comply with the provisions of any Act, regulation, order or direction governing the drilling for, production, conservation, gathering, transportation, processing, purchasing, acquisition, sale, measurement, reporting, testing, supply or delivery of gas within the Province.

14. Attached hereto as Appendix A to this permit is the order of the Lieutenant Governor in Council authorizing the granting of this permit.

MADE at the City of Calgary, in the Province of Alberta, this

ENERGY RESOURCES CONSERVATION BOARD

G. J. DeSorcy
Vice Chairman

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ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

DIAMOND SHAMROCK EXPLORATION OF CANADA, LTD.
APPLICATION FOR A WELL LICENCE
PEMBINA FIELD

Decision D 86-8
Application 860346

## 1 INTRODUCTION

### 1.1 Application and Intervention

Diamond Shamrock Exploration of Canada, Ltd. (Diamond Shamrock) applied, pursuant to section 2.020 of the Oil and Gas Conservation Regulations, for a licence to drill a directional well to the Cardium Formation in legal subdivision 10 of section 9, township 47, range 1, west of the 5th meridian (10-9), in the Pembina Field. The well would be drilled from a surface location in legal subdivision 8 of section 15, township 47, range 1, west of the 5th meridian, because the target area is under Pigeon Lake (see attached figure). Several objections to the application were submitted by concerned individuals who reside or own property in the vicinity of the proposed well site.

### 1.2 Background

For the past several years, Diamond Shamrock has been developing a Cardium oil reservoir under Pigeon Lake. The well sites are located close to the recreational area and summer villages situated along the lake. The proposed 10-9 well site is approximately 200 metres from the closest dwelling. Several meetings of local residents, the summer village councils, Diamond Shamrock, and the Energy Resources Conservation Board (ERCB) have taken place during the drilling phase of this development to discuss concerns raised by the residents.

Having regard for the objections to this application, the ERCB directed that it be considered at a public hearing. Notice was issued on 14 March 1986 for a hearing to be held on 29 April 1986 in Edmonton, Alberta. Except for the applicant, no submissions with respect to the proposed well were filed with the ERCB as required by the notice of hearing. A letter was submitted by a summer village in the area noting a concern with what it alleged is a type of industrial intrusion. A telephone survey by ERCB staff confirmed that those individuals who had objected did not plan to attend the hearing to question the applicant or argue their position. However, they stated that their objections remained. The Board therefore cancelled the hearing since it was clear that those who objected did not plan to attend.

## 2 CONSIDERATION OF THE APPLICATION

### 2.1 Details of the Application

Diamond Shamrock submitted that it had acquired the right through an Alberta Crown petroleum and natural gas lease to explore and produce from all formations down to and including the Cardium Formation in the northeast quarter of section 9-47-1 W5. It stated that the 10-9 well is necessary to continue the development of the Cardium oil reservoir under Pigeon Lake.

Diamond Shamrock also submitted that, based on its experience gained from drilling, completing, and producing existing directional wells, as the horizontal displacement of a directional well increases so do the risks, drilling and production costs, and related problems. It further stated that its costs increase linearly with horizontal displacement to a distance of 2400 to 2500 metres and that thereafter costs increase exponentially. Therefore, it contended that the maximum economic horizontal displacement is 2400 to 2500 metres.

Diamond Shamrock considered four surface locations as possible alternatives to the proposed location. One which was suggested by the objectors was located at the applicant's existing well sites in the southeast quarter of section 14-47-1 W5. Diamond Shamrock dismissed three of the locations because it was unable to obtain surface leases and dismissed the location preferred by the objectors because it would make the well uneconomic.

Diamond Shamrock submitted that it had received consents from the owner of the land at the proposed well site and from the adjacent summer village on the proviso that certain mitigative measures were undertaken. These measures included

- noise reduction,
- water well monitoring and testing,
- landscaping,
- protection of groundwater,
- fluid containment,
- timing of the drilling of the well, and
- permanent production facilities.

Diamond Shamrock stated that it had made every reasonable effort to obtain a suitable surface location. It planned to reduce the impact of the proposed well on the environment and residents by locating it adjacent to an existing well site and by completing the undertakings outlined in its supplemental submission and Land Use Impact Assessment report filed in connection with a previous well licence application.

## 2.2 Details of the Objections

The ERCB received letters from one individual, one organization and fifteen form-letter objections from individuals residing adjacent to the proposed well. These opposed oil activity in the vicinity of the Summer Village of Golden Days and recommended that an alternative site at a sufficient distance from the village be selected.

The letters set out the following concerns:

- destruction of cross-country ski trails,
- possible air, land, and water pollution,
- protection of water quality of Pigeon Lake,
- effects on commercial and recreational fishing,
- intrusion of industrial development in a recreational area, and
- lack of public involvement in the development.

The Board believes it is aware of and understands the details of the objections through ERCB staff involvement, which included site visitations and private and public meetings with the local residents to discuss their concerns, company drilling plans, and impacts. An extensive survey of area residents and summer village officials was carried out by ERCB staff in January 1986 to assess the general level of concern and the need for information regarding oilfield development in the area.

## 2.3 Views of the Board

The Board believes that the concerns and issues surrounding this application have been adequately identified; therefore, it will proceed to its decision on the basis of the factual information submitted.

The Board accepts Diamond Shamrock's right to develop the reserves which may underlie the northeast quarter of section 9, and therefore accepts the need for a well to recover these reserves provided it can be drilled and operated in a satisfactory manner, having regard for the public interest.

The Board agrees that the excessive horizontal displacement involved in drilling this well from the location in the southeast quarter of section 14-47-1 W5, suggested by the objectors, would present an unreasonable risk and cost. The Board believes that the reduction of impact on the local residents and the environment would not justify the increased risk of reducing the ultimate recovery of the oil reserves and the increased costs associated with drilling a directional well requiring a greater deviation.

The Board also notes that Diamond Shamrock has situated the proposed surface lease adjacent to an existing lease and that it would utilize the existing access road. Therefore, the Board believes that the applied-for location is acceptable, provided any resulting impacts are mitigated. The Board expects Diamond Shamrock to take the necessary precautions and mitigative measures detailed in its supplemental submission and Land Use Impact Assessment report. These are itemized in Attachment A to this report.

The Board is satisfied that the location of the proposed well is acceptable and that the drilling and production of the well will not cause such adverse effects on either the residents or the environment that the licence should be denied or the well relocated.

## 3 DECISION

The application is approved subject to the following special condition which will be included on the well licence:

- The drilling and production of this well shall be conducted in accordance with the procedures, practices and equipment outlined in the supplemental information filed in support of the well licence application unless otherwise directed by a representative of the Board.

DATED at Calgary, Alberta, on 15 May 1986.

ENERGY RESOURCES CONSERVATION BOARD

V E Bohme

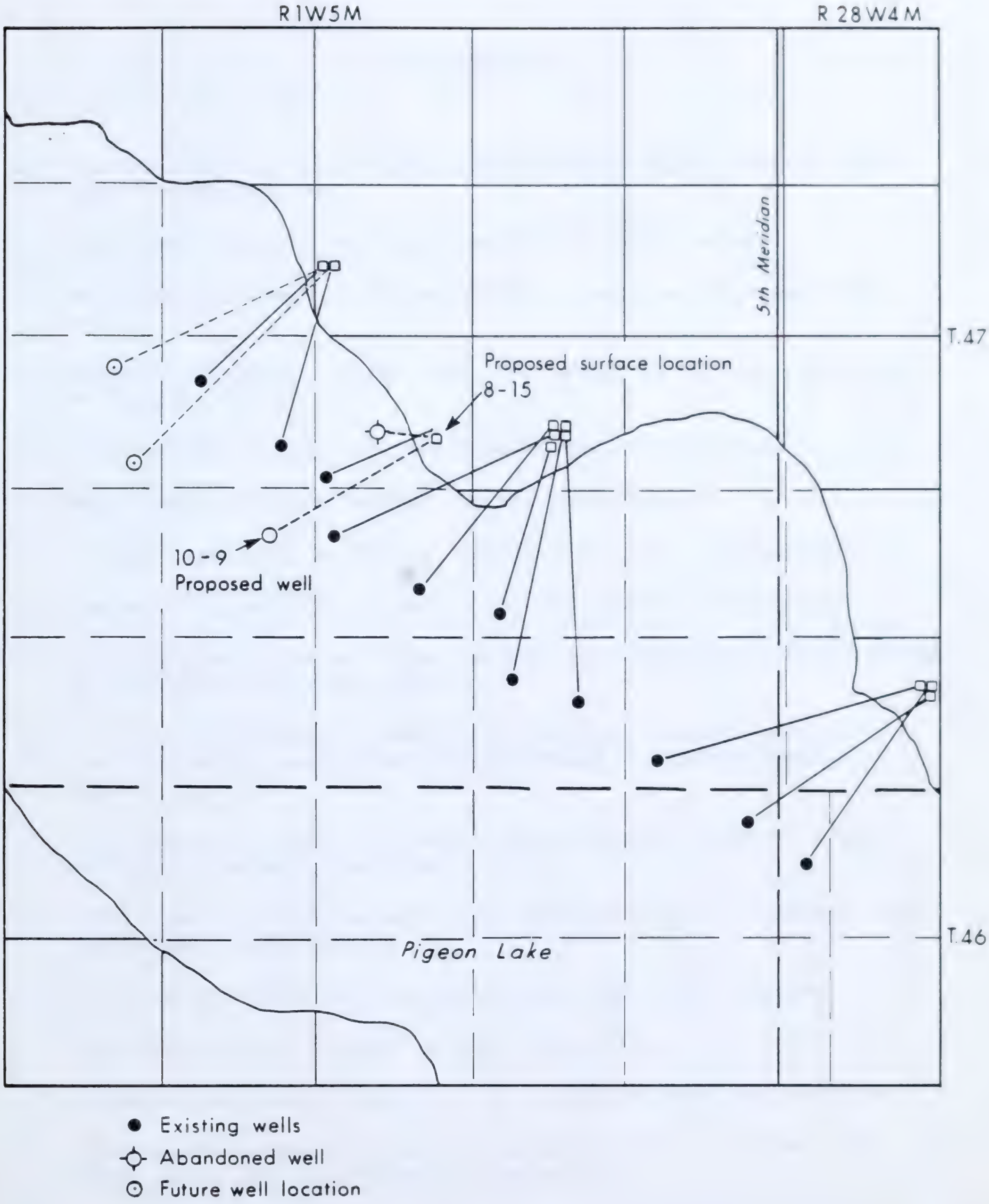
V. E. Bohme, P.Eng.
Board Member

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

H J Webber

H. J. Webber, P.Eng.
Acting Board Member



DIAMOND SHAMROCK PIGEON LAKE DEVELOPMENT
APPLICATION No. 860346

(Adapted from Figure 1 of Diamond Shamrock's Supplemental Submission)

## ATTACHMENT A

- The drilling rig will be positioned so that engine exhausts point away from residences.
- Additional mufflers will be installed to reduce noise.
- Mufflers will be installed on service trucks such as cementing units.
- Delivery of casing, cement, and other supplies will be restricted to daylight hours.
- Heavy trucks will not be permitted to use Village roads.
- Water wells will not be used for rig water supply.
- A remote sump will be used to prevent pollution of groundwater.
- The well site will be bermed to prevent runoff of any fluids.
- Tripping operations and other unusual operations will be restricted to daylight hours when possible.
- Any request by property owners for testing of water wells for quantity and/or quality will be performed at Diamond Shamrock expense.
- The pumping unit will be powered by an electric motor with sound reduction equipment installed.
- After completion of the well, the location will be landscaped and housekeeping maintained.
- Drilling will be restricted to the fall and winter seasons.
- All waste will be disposed of at a remote site.
- Permanent production facilities and pipelines will be installed.
- A vacuum truck will be available 24 hours a day to recover any fluids which may be spilled accidentally.
- All ERCB regulations will be adhered to.

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ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

TRANSALTA UTILITIES CORPORATION
CASCADE HYDRO DEVELOPMENT MODIFICATIONS

Decision D 86-9
Application 860467

## 1 APPLICATION

TransAlta Utilities Corporation applied, pursuant to section 7 of the Hydro and Electric Energy Act and section 19 of the Hydro and Electric Energy Regulation, for approval to modify the Cascade Hydro Development and Ghost Diversion, which is an integral part of the Development, to pass the probable maximum flood flow without failure of the dam by overtopping.

The subject application was set down for a public hearing on 9 July 1986 at the offices of the Board. The notice indicated that if the Board did not receive submissions opposing the application by 2 July 1986 the hearing would be cancelled and the application granted. No submissions were filed with respect to this application.

The applicant received approval from park authorities to carry out those modifications that lie within Banff National Park.

## 2 BACKGROUND

In Decision D 85-13, issued on 27 February 1985, the Board approved modifications to increase the spill capacity of the Bearspaw Hydro Development and accepted, in principle, the need for modifications to the spill capacities at the Ghost and Cascade plant sites and to the Ghost Diversion, but did not approve these latter modifications pending specific applications to the Board. The present application deals with specifics of the proposed modifications at the Cascade site and the Ghost Diversion. An application for modifications at the Ghost site is expected at some future time. The locations of all hydro developments and plants on the Bow River system are shown on the attached figure.

## 3 DECISION

The Board has considered Application 860467 by TransAlta Utilities Corporation pursuant to section 7 of the Hydro and Electric Energy Act and section 19 of the Hydro and Electric Energy Regulation. The Board finds that the applied-for modifications to the Cascade Hydro Development, including the Ghost Diversion, are appropriate and necessary in the public interest and for public safety. Therefore, the

Board approves the application and its construction schedule to complete the modifications in 1986.

DATED at Calgary, Alberta, on 10 July 1986.

ENERGY RESOURCES CONSERVATION BOARD

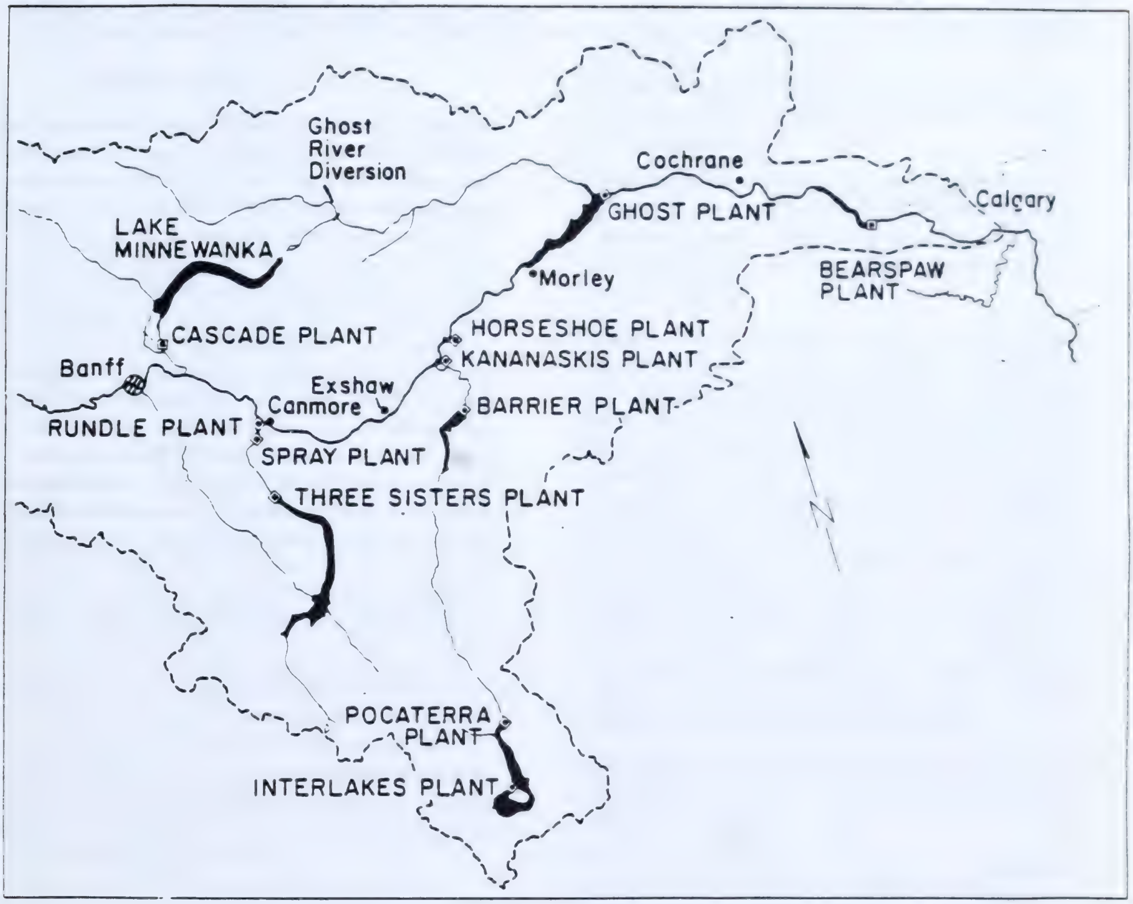
C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

N. A. Strom, P.Eng.
Board Member

Homeniuk

T. F. Homeniuk, P.Eng.
Acting Board Member



BOW RIVER AREA
TRANSALTA UTILITIES CORPORATION
EXISTING HYDRO DEVELOPMENTS
BOW RIVER BASIN

D86-9
ERCB

ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

# PANCANADIAN PETROLEUM LIMITED COMMERCIAL OIL SANDS PROJECT LINDBERGH AND FROG LAKE SECTORS

**Decision D 86-10**
**Application 860168**

## 1 INTRODUCTION

PanCanadian Petroleum Limited (PanCanadian) applied pursuant to section 10, subsection (1) of the Oil Sands Conservation Act, for approval to construct and operate Phase 1 of a proposed 3-Phase commercial project. This phase of the project includes the recovery of an average of 500 cubic metres per day of crude bitumen from the Cold Lake Oil Sands Deposit from a 16-section development area in the Lindbergh and Frog Lake Sectors, as shown on Attachment 1. In addition, PanCanadian proposes that all previous Board Approvals (No. 4356, 4680, Misc 8501, and CP 2942) related to the existing experimental scheme and central processing plant (CPP) be included in the approval of this application. Supportive material respecting environmental impacts and mitigative measures, including applications to Alberta Environment (AE) for permits and licences under the Clean Air Act and the Clean Water Act, and socioeconomic impacts associated with the project have also been filed by PanCanadian.

The application was orginally advertised for a public hearing which was to commence on 3 June 1986 in Elk Point, Alberta. As only one site-specific objection to the application was received, the Board decided to adjourn the hearing sine die pending an attempt to resolve the landowner concerns outside of the hearing process. The concerns were subsequently resolved and the hearing was cancelled.

## 2 THE APPLICATION

The details of the application are summarized below:

- The production of an average of 500 cubic metres per day of bitumen over the 20-year project life with a peak production of 700 cubic metres per day of bitumen.
- An increase in the approved capacity of the existing CPP in section 3-56-6W4M from 500 to 700 cubic metres per day of bitumen. All bitumen production from Phase 1 would be trucked to the CPP where it will be mixed with condensate to form a pipelineable product. This mixture would be pumped through pipeline to the Husky Lloydminster lateral to the east.
- Reduction in well spacing to 4 hectares for the southeast quarter and the north half of section 3-56-6W4M and all of section 7-55-5W4M in order to make provision for cyclic steam stimulation. The bottom-hole locations will be selected to fit a 7-spot pattern development.
- Cyclic steam stimulation of the Cummings Formation in sections 3-56-6W4M and 7-55-5W4M. Incremental bitumen recovery using cyclic steam stimulation is estimated to be 12 per cent of the original bitumen in place (OBIP).
- Reduction in well spacing from 64 hectares to 16 hectares for seven sections within the project area (27-55-3, 33-55-3, 3-56-3, 5-56-3, 7-56-3, 9-56-3, and 19-56-6) all west of the 4th meridian. The proposed target areas associated with the spacing reduction would allow the four wells per quarter to be drilled vertically in the central portion of the quarter section. This would provide for future development from a centrally located pad without having three non-pad vertical wells as is the case for 16-hectare spacing with southeast corner target areas. The primary wells to be drilled on these sections have the potential for completion in the Colony, McLaren, Waseca, Sparky, General Petroleum, Rex, Lloydminster, Cummings, or Dina Formations.
- Board Approvals No. 4356 and 4680 as well as Misc 8501 and CP 2942 are to be included as part of the commercial project.
- Primary recovery for the project area is estimated to be 3 per cent of the crude bitumen in place for the 16-hectare well spacing.
- Phase 1 includes the existing 113 wells drilled to 31 December 1985 and an additional 165 wells to be drilled over the next 20 years.
- Directional wells would be drilled from pads (12 wells per pad and 4 previously drilled vertical wells) for each quarter section, approved for cyclic steam stimulation, according to an inverted 7-spot pattern on a 4-hectare well spacing.
- Forecasts show that for Phase 1 development the water demand will increase from about 200 cubic metres per day in 1986 to a peak demand of 1200 cubic metres per day in 1996. If Phases 2 and 3 of the project were to proceed at a later date, a peak demand of 9600 cubic metres per day would be required. At present, PanCanadian receives fresh water supply via Westmin Resources river intake

facility and pipeline from the North Saskatchewan River as approved under AE water use permit (licence) No. 13527.

- A produced water recycle system is not proposed as part of the Phase 1 development. Water disposal would be handled by two existing disposal wells in Lsd 10A-9-55-6W4M and Lsd 6-3-56-6W4M by injection into the Lloydminster and/or Beaverhill Lake Formations.
- Fuel demand for Phase 1 is expected to peak at 35 106 x $10^3$ cubic metres of gas in 1998 and decline to 8434 x $10^3$ cubic metres in 2006. The majority of the fuel demand is comprised of steam generator fuel which, at present, is supplied in the form of compressed natural gas from Novacorp.

The Board has reviewed the technical details of the project and is satisfied with the drilling, completion, and production strategy as presented by PanCanadian. In addition, the Board notes that the phased approach should permit the incorporation of technological improvements in existing and future facilities.

The Board is concerned with the relatively low recovery, estimated at 15 per cent of the OBIP, for the initial thermal recovery process. However, the Board also notes PanCanadian's plans to follow-up the cylic steam stimulation process with a steamflood or fireflood process which is expected to increase the bitumen recovery to approximately 25 per cent of the OBIP. The Board would expect PanCanadian to confirm recovery levels as the project proceeds and to submit plans to the Board for steamflood or fireflood schemes prior to abandonment of cyclic-steaming operations in a given area. Furthermore, the Board would expect PanCanadian to continue research into water recycling and provide regular reports on progress in this regard.

### 2.1 Socioeconomic Impacts of the Commercial Oil Sands Scheme

PanCanadian completed a public information and involvement program consisting of information brochures, personnel contact and an open house for area residents. In addition, meetings were held with municipal and provincial government representatives. PanCanadian attempted to resolve any concerns expressed through the public awareness program. In summary:

- Construction for Phase 1 involves the drilling of 20 wells in each of 1986, 1987, and 1988. From 1991 to 2003, 15 wells will be drilled in every second year for a total of 165 wells for Phase 1. This schedule has been revised as a result of the drop in the selling price for crude bitumen.
- Over the life of the project, the average size of the construction work force, on an annual basis, will range from a low of 12 people to a high of 34 people. From 1986 to 1989, the average number of construction employees coming from the local area will be 6.5. The remaining construction employees, 12 on average, will come temporarily from outside the impact area.
- Capital expenditures for Phase 1 are estimated to be $91 million (1985 dollars), not including investments prior to 1985.
- Project operating costs are predicted to average approximately $26 million per year, resulting in an estimated total of $668 million over the project life.

Regarding employment and training arrangements, PanCanadian indicated that their informal recruitment policy is to encourage local hiring. Of 29 on staff now, 18, or 65 per cent were hired in Elk Point or area. In addition, PanCanadian adheres to the Individual Rights Protection Act in employment. Furthermore, all employees are expected to reside in the near vicinity.

The Board is satisfied that PanCanadian has adequately addressed the regional, social, and economic impacts resulting from the project. The Board notes that the proposed construction activity and manpower requirements are relatively modest for Phase 1, and therefore should be easily manageable within the existing community services and infrastructure.

### 2.2 Environmental Impacts

PanCanadian believes that its existing procedures for site maintenance, weed control, site drainage, and spill clean-up will adequately protect environmental resources and minimize nuisance problems. In addition, the oil sands resources would be developed in a manner consistant with effective conservation practices and with minimal environmental impact. Calculations by PanCanadian of emissions to the atmosphere indicate that air quality standards would be met during Phase 1. Continuing review of emissions and emission control systems in addition to facility consolidation on pads will ensure that air emissions are minimized.

PanCanadian also believes that it can develop its Phase 1 project without causing a constant noise nuisance.

Specific environmental details are:

- To minimize noise annoyance to nearby residents, construction of leases would normally be limited to daylight hours and restricted on Sundays. In addition, special silencers would be used on the rig's diesel motors if the rig is located close to a residence and a noise control system would be employed on the generator associated with the steaming operation.
- As necessary, vapour recovery systems are used to reduce emissions to the atmosphere. The cleaning

plant has an extensive recovery system that allows vapours to be collected and directed to an incinerator. As additional pads are constructed, vapour recovery systems would be installed.

- On single primary well sites, casing gas and storage tank vapours would be vented to atmosphere. Single steamed well casing gas is flared while storage tank vapours are burned in a portable incinerator.
- Gas produced from wells on a pad would be collected and flared during primary and steamed production. The cleaning plant vapour recovery system would collect storage tank and process relief gases and burn them in an incinerator.
- Surface water in the area would not be used for steam generation. With the appropriate agreements, PanCanadian intends to continue transporting its licenced water requirements through Westmin Resource Ltd.'s water supply line.
- Regarding increased traffic associated with the placing of additional wells on production, PanCanadian has taken steps to reduce annoyance. Guidelines have been established covering truck operation, regulation of traffic and safe operating practices which all company and contractor personnel are required to follow.
- The use of multiple well sites would result in greatly reduced land requirements. Typically, 16 single facility wells on a quarter section would require a total of 18 to 20 hectares (45 to 50 acres). With 12 wells on a centralized pad, and the existing four wells tied in by buried flowlines, total acreage required would be reduced to about 6 to 8 hectares (15 to 20 acres).

The Board is satisfied that the environmental impacts of the project are acceptable. The Board would expect PanCanadian to continue monitoring of air emissions and noise levels to ensure compliance with the appropriate guidelines. The Board also notes that applications have been filed under the Clean Air Act and the Clean Water Act.

## 3 INTERVENTIONS

Application No. 860168 was advertised for a public hearing to be held in Elk Point starting on 3 June 1986 with the proviso that the hearing would not be held if no interventions opposing the project were received. A letter submitted on behalf of John and Rose Shymkiw, and Harry and Mary Shymkiw indicated some general but unspecified concerns with the project. The Board initiated informal discussions with the Shymkiws to determine the basis of the opposition and to determine if an acceptable solution for the applicant and intervener was possible. It was determined that the Shymkiw opposition was based primarily on the following:

- Location of well pads in the east half of section 3-56-6W4M.
- Size of existing surface leases.
- Development schedule.

The Board staff pursued a solution to these matters through discussions involving the Shymkiws (including their legal representative), PanCanadian, and Board staff. The result was a written commitment by the applicant, subsequently accepted by the interveners and acknowledged by the Board's Oil Sands Department, which addressed the previous matters of concern. The agreements reached and the documents provided to support those agreements are considered to be part of the overall application for this project and consequently have been included in the application package.

The Elk Point Surface Rights Association also indicated a desire to express some concerns at the public hearing, however, when advised that the Shymkiws' concerns had been resolved, it advised the Board that it did not wish the hearing to proceed.

Therefore, as the interventions were satisfactorily resolved, the hearing was cancelled.

## 4 OTHER MATTERS

### 4.1 Existing Lease Size

The Shymkiws objected to the central pad locations as proposed by PanCanadian for the east half of Section 3, Township 56, Range 6, West of the 4th Meridian (E 1/2 3-56-6W4M) because of the potential negative impacts (odours and noise) due to the proximity to John and Rose Shymkiw's residence and the farming operations in the remainder of the half section. As a result of subsequent discussions between the Shymkiws and PanCanadian, the pad locations for E 1/2 3-56-6W4M were shifted to the locations shown on Attachment 2 to this report. All other pads will be developed in the central portion of the remaining quarter sections as outlined in the application.

The Board finds the new pad locations for E 1/2 3-56-6W4M to be acceptable and accepts that the application has been amended to reflect this change.

The Board recognizes that the location of drilling pads, the associated reduction in land available for agricultural use and negative impacts on adjacent landowners and occupants will continue to be one of the major concerns in this area. It is also aware that as development of this area proceeds there may be technological improvements in drilling, completion and production equipment and practices which may allow for reduction in the number of pads per section and provide for more flexibility in the location of the pads. Consequently, notwithstanding the fact that a certain development concept had been approved at the time of the original application, the Board would expect PanCanadian and other operators in this area to incorporate changes when they occur and are proven to be technically and economically successful. Any changes would be discussed with the Board and affected landowners and occupants before any changes are implemented.

### 4.2 Lease Size and Diking

In regards to lease size, the Board notes that a lease must be adequately sized to meet its equipment spacing requirements during all facets of operations on the site, that is drilling, well servicing, production, and steaming. As the active portion of the lease will vary in size with each of the previously mentioned activities, there will be times when portions of the original lease area are not required for continued usage by the licensees. During those times, the Board would encourage operators to reduce the active lease area within reasonable limits and to allow the landowner or occupant to farm the unused portions of the lease. This will help to reduce the amount of farm land taken out of production and with the appropriate lease contouring can reduce the impact on farming operations.

The need for a dike around the entire lease was also raised as a concern. The Board has reviewed this situation and is prepared to suspend the requirement for diking the entire lease area in cases where there are no environmental concerns (no immediately adjacent water bodies) and where the landowner and occupant indicates that he does not wish to have the well site diked. The Board, therefore, authorizes its Bonnyville Area office to suspend the lease diking requirements in situations where the operator can show that the above-mentioned criteria have been met.

### 4.3 Development Schedule

A modified schedule from that proposed in the original application was put forward by PanCanadian in order to clarify the timing of development plans for some of the lands in the project area. The Board considers the following schedule to be the best available estimate of the timing for the development of the areas to be subjected to the cyclic steaming process and accepts it as the revised development schedule for the project.

| Schedule | Pad to be Developed |
|---|---|
| 1990 | NW 1/4 3-56-6W4M |
| 1993 | NE 1/4 3-56-6W4M |
| 1995 | SE 1/4 3-56-6W4M |
| 1997 | NW 1/4 7-55-5W4M |
| 1999 | NE 1/4 7-55-5W4M |
| 2001 | SE 1/4 7-55-5W4M |
| 2003 | SW 1/4 7-55-5W4M |

The development schedule shown in the original application also included the drilling of primary wells on 16-hectare well spacing. No official revision has been made to this schedule, however, the Board notes that this development has been delayed for at least 1 year as well.

The Board notes that the proposed development schedule for the project, while being advanced in terms of development in specific lands, has slipped in general terms from that proposed in the original application. While the Board appreciates the difficulty in making firm commitments to project construction schedules, the Board must also have regard for general planning and development factors to ensure orderly and timely development of the resources as well as technological advancement. Therefore the Board proposes to introduce a lapse time for reasonable progress of the Phase 1 activities. The Board considers a lapse period of about 3 years from the date of the approval suitable for that purpose, after which approval of the commercial scheme would be cancelled if project construction had not commenced or the operator had not received approval to extend the date based on circumstances existing at that time.

### 4.4 Produced Water Recycling

PanCanadian indicated that it has no plans to recycle produced water under Phase 1 operations, however, it does recognize the need for a produced water reuse program to minimize the use of available fresh water and to reduce produced water disposal requirements. The main obstruction to produced water reuse is the extremely high total dissolved solids (TDS) levels and the lack of a commercially-proven technology to permit reduction of that level of TDS to acceptable levels. PanCanadian also indicated that removal of oil, suspended solids, and silica will require some further evaluation at the field level. PanCanadian stated that it has been an active participant in joint industry-government dialogues with regards to testing of possible produced water clean-up systems and that it has expressed an interest in supporting a field test of a recycle system.

The Board accepts that under current economic conditions, implementation of produced water recycle is not practical at this time, however, the Board continues to regard the development and implementation of water recycle technology as a very important goal. The Board also recognizes that with the turn down in the economy associated with the low oil and crude bitumen prices, a number of primarily research type projects may have to be put on hold. Notwithstanding this fact, the Board will expect PanCanadian and other operators in the Lindbergh area to continue with all diligent efforts, whenever reasonably possible to do so, towards the testing and development of produced water reuse technology. In addition, PanCanadian will be required to provide an annual statement respecting its programs for investigation and testing of produced water reprocessing technology.

## 5 THE DECISION

Having reviewed the details of the proposed commercial oil sands scheme and having regard for the potential impacts and public benefits, the Board is prepared to grant Application No. 860168, with conditions, and with the provision that if the development schedule does not proceed as outlined under section 4.3, the approval may be cancelled.

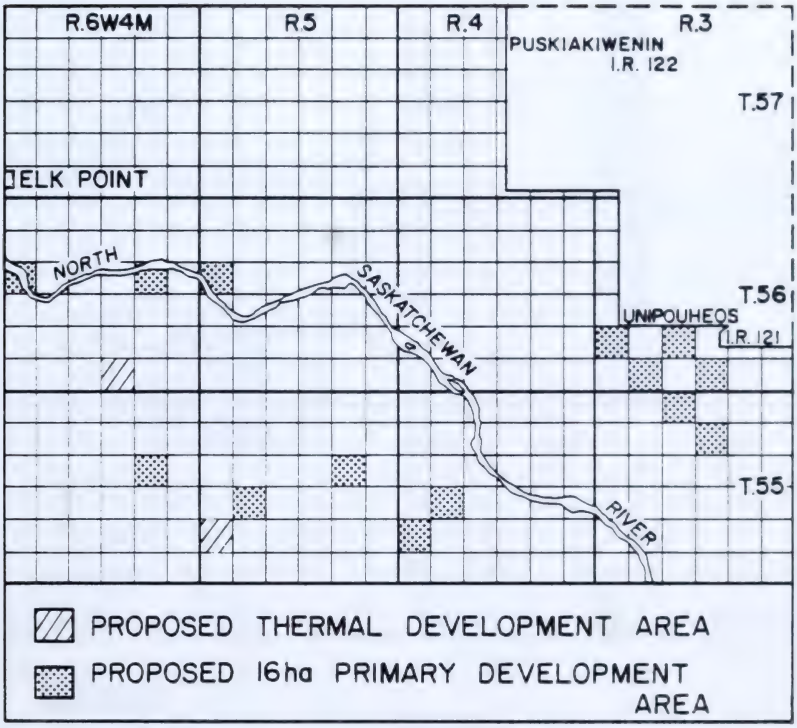
Subject to receipt of the necessary Order in Council and Ministerial Approvals, the ERCB will issue its approval.

DATED at Calgary, Alberta, on 14 August 1986.

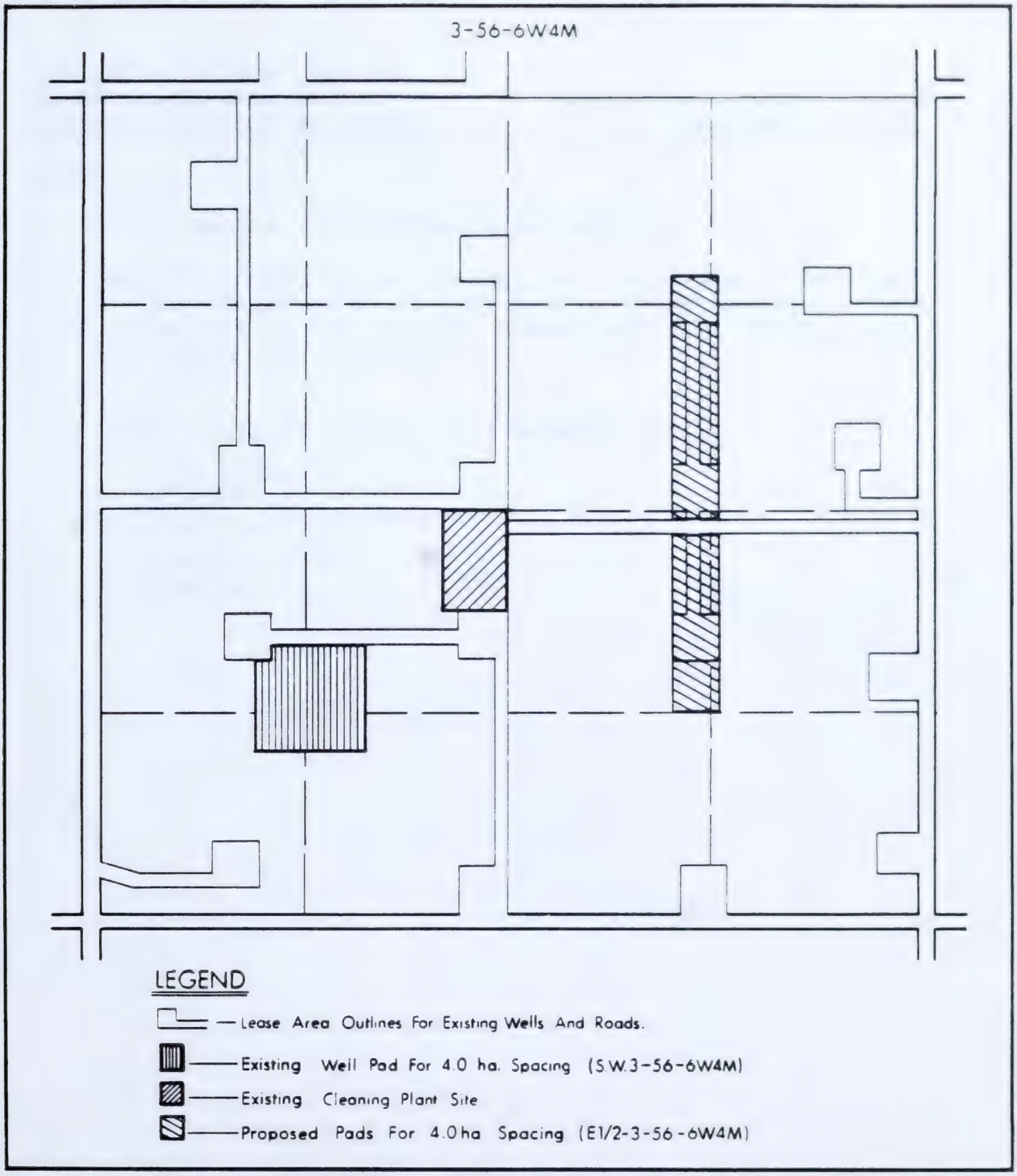
ENERGY RESOURCES CONSERVATION BOARD

Bellows

L. A. Bellows, P.Eng.
Board Member



ATTACHMENT I. PANCANADIAN LINDBERGH AND FROG LAKE OIL SANDS PROJECT.


3-56-6W4M
LEGEND
— Lease Area Outlines For Existing Wells And Roads.
▥ —— Existing Well Pad For 4.0 ha. Spacing (S.W.3-56-6W4M)
▨ —— Existing Cleaning Plant Site
▧ —— Proposed Pads For 4.0 ha Spacing (E1/2-3-56-6W4M)

ATTACHMENT 2. SECTION 3-56-6W4M AND PROPOSED SURFACE FACILITY LOCATIONS.

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

PANCANADIAN PETROLEUM LIMITED
COMMERCIAL OIL SANDS PROJECT
LINDBERGH AND FROG LAKE SECTORS

Addendum to Decision D 86-10
Application 860168

## ERRATA

1. **Page 5, section 4.4, Produced Water Recycling**

   Due to a reproduction error, the first line of page 5 which read "...projects may have to be put on hold. Notwithstanding..." was omitted from Decision D 86-10. Please replace the original with the revised page 5 attached.

DATED at Calgary, Alberta, on 2 September 1986.

LA Bellows

L. A. Bellows, P.Eng.
Board Member

projects may have to be put on hold. Notwithstanding this fact, the Board will expect PanCanadian and other operators in the Lindbergh area to continue with all diligent efforts, whenever reasonably possible to do so, towards the testing and development of produced water reuse technology. In addition, PanCanadian will be required to provide an annual statement respecting its programs for investigation and testing of produced water reprocessing technology.

## 5 THE DECISION

Having reviewed the details of the proposed commercial oil sands scheme and having regard for the potential impacts and public benefits, the Board is prepared to grant Application No. 860168, with conditions, and with the provision that if the development schedule does not proceed as outlined under section 4.3, the approval may be cancelled.

Subject to receipt of the necessary Order in Council and Ministerial Approvals, the ERCB will issue its approval.

DATED at Calgary, Alberta, on 14 August 1986.

ENERGY RESOURCES CONSERVATION BOARD

L A Bellows

L. A. Bellows, P.Eng.
Board Member

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

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CHEVRON CANADA RESOURCES LIMITED
GAS PROCESSING - KAYBOB SOUTH AND VARIOUS FIELDS
PRE-HEARING MEETING, 14 AUGUST 1986

Memorandum of Decision
Application 860159

By letter dated 10 June 1986, the Board indicated that it was prepared to approve a "Part II" application by Chevron Canada Resources Limited to operate its Kaybob South deep-cut facilities at an ethane recovery efficiency of 96.4 per cent. Copies of the Board's letter of approval to Chevron were sent to interveners to the Part I application, which had been the subject of a Board hearing held in June 1982 (ERCB Report 82-G).

Subsequently, the Board was made aware of additional details affecting the application and decided to reconsider its decision. Following notice of the above referenced application, a number of companies filed objections to the application, and the Board scheduled a meeting for 14 August 1986 to discuss:

- the need for a hearing to consider the application,
- the issues to be addressed if a hearing were held,
- the dates for the hearing and filing of submissions if a hearing were held, and
- other related procedural matters.

Table 1 lists those who appeared at the 14 August 1986 meeting.

As indicated on many occasions, the Board encourages negotiations between resource owners and the straddle plant owners prior to the installation of redundant field deep-cut facilities, and will continue to do so in the future. Although it does not have the details, the Board accepts that some "alternative arrangements" have been reached between certain of the Kaybob South producers, and the straddle plant system. The ethane in the gas of those producers is thus not available to Chevron at its field facility. The Board therefore considers that Chevron's application to increase the ethane recovery efficiency would result in production of incremental volumes of ethane over those approved in ERCB Report 82-G, and not simply substitution volumes for the ethane previously approved for removal from the gas which will by-pass the deep-cut unit.

For this reason, the Board denies Chevron's request that it simply re-instate the approval indicated in its 10 June 1986 letter. Rather, it will assess the application as a request to recover additional ethane.

Having considered the positions put forward by participants at the meeting, ie. that the Board has sufficient information to consider the application, the Board has decided that it will not call a hearing for that purpose. Additionally, on the basis of its review to this point, the Board is satisfied that it has the necessary information and is not requesting more from the applicant or other meeting participants. If, as its assessment proceeds, it sees the need for additional data, all participants in the meeting will be so-informed.

The Board decision and supporting reasons will be issued at a later date.

DATED at Calgary, Alberta, on 25 August 1986.

G J DeSorcy

G. J. DeSorcy, P.Eng.
Vice Chairman

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

F. J. Mink, P.Eng.
Acting Board Member

TABLE 1 THOSE WHO APPEARED

Principals and Representatives
(Abbreviations used in memorandum)

---

Chevron Canada Resources Limited (Chevron)
J. Stein

Dome Petroleum Limited
and
Dow Chemical Canada Inc.,
Union Carbide Ethylene Oxide/Glycol Company,
C-I-L Inc.,
Celanese Canada Inc., and
Novacor Chemicals Ltd.
R. A. Neufeld

Amoco Canada Petroleum Company Limited
L. Scheible

Alberta Gas Ethylene Company Ltd.
H. D. Williamson

Alberta Natural Gas Company Ltd.
J. R. Smith

Energy Resources Conservation Board staff
M. J. Bruni
E. P. Moeller, R.E.T.
L. S. Fillion, C.E.T.

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

NORCEN ENERGY RESOURCES LIMITED
SOLUTION GAS PROCESSING PLANT AND
CENTRAL OIL BATTERY
SPIRIT RIVER FIELD

Decision D 86-11
Applications 860590 and 860647

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MAP OF PROPOSED SCHEME AND SURROUNDING AREA

# 1 INTRODUCTION

## 1.1 Applications and Hearing

Norcen Energy Resources Limited (Norcen) applied, pursuant to section 26 of the Oil and Gas Conservation Act, and in accordance with sections 7.001, 7.002, and 15.050 of the Oil and Gas Conservation Regulations, for approval to construct and operate a central multi-well oil battery and a sour gas processing plant in the Spirit River Field. The attached map shows the location of the plant sites and of the interveners' properties. The facilities would be situated adjacent to an existing water injection installation located in legal subdivision 8 of section 34, township 77, range 6, west of the 6th meridian (the 8-34 site), about 6 kilometres (km) south of the town of Spirit River. The gas plant would be designed to process a maximum of 112.7 thousand cubic metres per day ($10^3$ $m^3/d$) of currently flared sour solution gas, having a maximum hydrogen sulphide ($H_2S$) content of 1.7 mole per cent, from which 94.0 x $10^3$ $m^3$ of sales gas and 23.3 $m^3$ of liquefied petroleum gases (LPG mix) would be recovered. A maximum of 5.2 tonnes per day (t/d) of sulphur dioxide ($SO_2$)[1] (2.6 t/d sulphur equivalent) would be emitted to the atmosphere through a 50-metre (m) incinerator stack equipped with a pilot flame ignition system and a continuous fuel supply.

The applications were considered at a public hearing in Spirit River, Alberta, on 22 and 23 July 1986, with Board Members V. E. Bohme, P.Eng., L. A. Bellows, P.Eng., and R. G. Evans, P.Eng., sitting. The 8-34 site, Norcen's originally proposed site in Lsd 6-3-78-6 W6M (the 6-3 site), and the property of J. Lefley and D. Cairns (two local interveners) were visited as part of the hearing on the afternoon of 22 July 1986. Those who appeared at the hearing are listed in the attached table.

## 1.2 Background

The Spirit River Field was discovered in 1983 and to date a number of single-well and multi-well batteries have been constructed in the area, resulting in the flaring of sour solution gas produced with the oil. The four major operators and all working interest owners in the area unitized their interests in February 1986 and selected Norcen as unit operator. The pooling of interests has led to the implementation of enhanced recovery of the oil by water injection and centralization of production facilities.

Norcen initially considered centralizing all its battery facilities at the 6-3 site and had intended to construct a gas plant designed to process the gas from the central battery. In an effort to alleviate residents' concerns regarding the 6-3 site, Norcen made application to construct its central oil battery and gas plant at the proposed 8-34 location which is southeast of its existing central water injection facility.

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[1] Sulphur dioxide is a compound formed from equal weights of sulphur and oxygen. Therefore, the maximum daily emissions can be described as either 5.2 t/d of $SO_2$ or 2.6 t/d of sulphur.

### 1.3 Interventions

The White Mountain Environmental Society intervened on behalf of residents and landowners in the area. Two members in this group, J. Lefley, a honey producer and landowner in the area, and D. Cairns, a local resident and landowner in the area, also presented submissions at the hearing on their own behalf.

The interveners expressed concerns regarding the proposed gas plant's emissions, degradation of the area's air quality, noise, traffic, and general impact on the quality of life of the residents near the proposed plant. J. Lefley's specific concerns pertained to the possible impact plant emissions may have on his honeybee operation located approximately 1.6 km north-northeast of Norcen's proposed battery and plant site.

Alberta Environment appeared for purposes of cross-examination only.

## 2 ISSUES

The Board considers the issues regarding the applications to be

- the need for the proposed battery and gas plant,
- location and impact of the proposed plant, and
- consideration of alternative methods of sulphur disposal.

## 3 THE NEED FOR THE PROPOSED BATTERY AND GAS PLANT

### 3.1 Applicant's Views

Norcen stated that the proposed 8-34 central oil battery was required to consolidate 12 single-well and multi-well batteries in the Spirit River Triassic Unit No. 1, and that a gas processing plant was needed to process the sour solution gas currently being flared at the batteries in the Spirit River Field. The applicant said that all the raw gas would be gathered and following processing, liquid hydrocarbons recovered would be stored at the plant and trucked out regularly to market. Sweetened gas would be pipelined to a transmission system and sold. Norcen indicated it had held discussions with other oil and gas producers in the vicinity of its project. The applicant stated that these other area producers declined to participate in its scheme because

Norcen's proposal was further advanced and these other producers were unable to determine what their processing requirements would be at this time.

### 3.2 Interveners' Views

The interveners did not oppose the conservation of currently flared gas. However, they expressed concern about the effect of the gas plant on the environment and opposed the location of the plant.

### 3.3 Board's Views

The Board believes that both a centralized production facility in the Spirit River Field and a gas conservation plant are needed. Centralized production facilities would reduce the overall environmental impacts on the area as compared to a number of small facilities as well as increase the efficiency of the production operations. Conservation of gas, which would otherwise continue to be wasted, can only be accomplished if the sour solution gas is processed at a suitable gas plant.

With respect to processing other gas in the area, the Board notes that Norcen's proposed plant would not have spare capacity until after the first year of operation. However, if the Norcen plant is constructed and if other plants were proposed in the immediate area, the Board would require the proponents of such plants to investigate all alternatives including utilization of existing plants.

## 4 LOCATION AND IMPACT OF THE PROPOSED PLANT

### 4.1 Applicant's Views

#### 4.1.1 Location

The criteria used in selecting a site for the proposed gas plant included environmental concerns, population density, public response, and economic considerations. Norcen initially considered the 6-3 site because it was central to the other batteries in the area, but chose the 8-34 site when it learned that area residents were opposed to the 6-3 site. Norcen said the 8-34 site is farther away from J. Lefley's honey operation and is more favourable because there is a lower population density and heavy tree cover which would help to reduce visual impact.

#### 4.1.2 Impact on Honey Operations

In conjunction with its assessment of the local environment, Norcen conducted a literature review and discussion with bee experts in the province to evaluate the potential for plant emissions to affect bees and honey quality. The applicant acknowledged that few studies have been conducted on the effects of sulphur emissions on bees and its literature review did not identify any studies which addressed the effects of odours on honey quality. Norcen also conducted a survey of the views of Federal Government agricultural representatives, research personnel active in the apiary industry in the province, and the Alberta Beekeepers Association, and communicated with these experts as part of its investigation. One study that Norcen referenced was an evaluation of the effects of $SO_2$ on bees. It showed that there was no difference in sulphur levels between fumigated and control samples of adult bees, larvae, honey, or pollen. Norcen acknowledged that experimental evidence on the potential impacts of $SO_2$ and $H_2S$ on bees is neither complete nor conclusive.

Norcen summarized the responses it received from Alberta Agriculture, Agriculture Canada, and the Alberta Beekeepers Association that indicated there have not been any verified cases of bee or honey impact recorded among any of these agencies, nor any knowledge of any conflict between beekeepers, honey extraction plants, and sour gas processing plants. Norcen also indicated that its contacts acknowledged that honey has a propensity to absorb odours, which can cause an objectionable taste to the product. Through its review Norcen noted that the Canadian honey regulations recommend that honey extraction occur away from sources of objectionable odours. Although honey would be most sensitive to odours during the extraction process when it is in contact with ambient air, Norcen claimed that a persistent and strong odour would likely be required to impact honey taste and quality. The Federal inspectors who responded to Norcen's survey indicated that if a pronounced objectionable odour is detected in the honey, an export certificate would not be issued for the product.

A study submitted by Norcen, which evaluated bees continuously exposed to $SO_2$ concentrations of 0.14 parts per million (ppm) and 0.28 ppm, showed some reduction in flight activity. Norcen indicated that the 24-hour average maximum $SO_2$ concentration allowed by Alberta air quality requirements must not exceed 0.06 ppm. The experimental exposures used in the study were well above those that would be experienced in the vicinity of its applied-for gas plant even under persistent worst-case meteorological conditions. Based on the information available, Norcen concluded that since it would meet Alberta Environment's current air quality objectives for $SO_2$, the bees would be adequately protected.

### 4.1.3 Mitigation of Impacts

Norcen advised that emissions from its existing oil batteries include $SO_2$ from the flare stacks along with some $H_2S$ and hydrocarbon vapours vented from oil storage tanks, all of which would be eliminated with its proposed 8-34 plant. Field trucking of oil would be eliminated by use of flow lines to the 8-34 central battery and the treated oil from the battery would be pipelined to the Peace Pipeline Limited system. The solution gas separated from the oil would be sweetened and delivered to sales through a proposed tie-in to the NOVA, AN ALBERTA CORPORATION system. The acid gas from the gas plant's sweetening unit would be burned in a properly designed incinerator to provide virtually 100 per cent conversion of $H_2S$ to $SO_2$.

In addition, Norcen verified that it had used Alberta Environment's "STACKS" computer program to determine all the compressor and reboiler exhaust stack heights necessary to maintain nitrous oxides ($NO_x$) concentrations within the currently specified air quality guideline of 0.21 ppm.

Norcen committed to an ambient air monitoring program, for an initial 12-month period and for 2 months each year thereafter or as required by Alberta Environment, in which it would conduct continuous monitoring of $H_2S$ and $SO_2$ with a fixed monitoring unit and would record wind speed and direction. Norcen added it would also carry out the required static monitoring every month with sulphation stations as prescribed by Alberta Environment.

Norcen stated that its proposed location was more desirable than the 6-3 location when considering noise because it is surrounded by trees which would also reduce visual impact. The applicant indicated the only source of noise would be the two 300-kilowatt (kW) natural gas engine-driven main gas compressors. These would be housed in an acoustically insulated building and equipped with residentially rated exhaust silencers to ensure noise levels are within the Board's current noise control guidelines[2]. Norcen committed to taking noise level readings during initial start-up procedures to ensure that the levels comply with the guidelines.

Norcen indicated it had not completed arrangements for transporting LPG product recovered at the proposed plant. Based on its current production forecast Norcen estimated that during the first year of operation, shipment of the LPG product would require four trucks per week declining to two trucks per week within 2 years. The routing of those trucks has not been established; however, the most direct route from the proposed plant site would be to go 2.4 km south to what is referred locally as the White Mountain road, then 6.4 km east to Highway No. 2. Norcen dismissed the suggestion of D. Cairns that access to the 8-34 site should be from the north along a route parallel to Norcen's existing pipeline right of way, because it would require building a new road which in Norcen's view would be wasteful, impractical, and unnecessary, given that there are existing public roads.

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[2] Energy Resources Conservation Board, Noise Control Guidelines. Interim Directive ID 80-2.

Norcen stated it would be willing to meet periodically with area residents to address matters of interest such as developing acceptable schedules and routes for truck traffic. It expressed willingness to share its air monitoring and water sampling data, and to alleviate resident concerns through a community communication program. Also, its emergency response plan would be modified and would incorporate input from area residents.

## 4.2 Interveners' Views

### 4.2.1 Environmental Impacts

In its written intervention the White Mountain Group suggested that Norcen be requested to move from its proposed 8-34 location to one which would not have as significant an impact on area residents. They did not propose any specific alternative location. Generally the White Mountain Group expressed concern that emissions, odours, and noise from the plant would have an adverse effect on area residents and could cause environmental impacts. Of special concern was the possible economic impact that Norcen's plant may have on J. Lefley's honey operation which employs up to 20 community members during 2 months of the year.

D. Cairns' residence is about 2.4 km south-southeast of Norcen's 8-34 site. He expressed concern about plant emissions, noise, and the applicant's proposed access road but suggested that if Norcen rerouted its access road to run cross-country along an existing pipeline right of way from 6-3 southeast to 8-34 rather than utilize county roads east and south of section 34, his concern would be alleviated. D. Cairns stated that he would not object to Norcen's proposal if the acid gas was injected into the subsurface or if the raw gas was pipelined to Shell's Progress plant. He also stated the use of electric motors for the main gas compressors at the proposed 8-34 site would alleviate his concern about plant noise.

The White Mountain Group claimed that the presence of a gas plant in the area would be an intrusion and would impact their life-style. They contended that the relocation of the proposed plant from 6-3 to 8-34 had not alleviated the residents' concerns. The White Mountain Group said that despite the testimony of "experts" that have presented evidence previously as well as at this proceeding, they still remained concerned that the plant emissions could cause environmental damage and could adversely affect human health. They acknowledged that recently there had been improvements made in the area with respect to reducing odours. They indicated a willingness to have on-going dialogue with Norcen to obtain monitoring results as well as to help resolve some remaining issues such as the applicant's final emergency response plan and scheduling and routing of truck traffic, should the proposed plant be approved. They acknowledged that possible future complaints about operations in the area could be dealt with through close community and operator contact.

### 4.2.2 Impact on Honey Operations

The White Mountain Group and J. Lefley stated they had remaining concerns about the effects of sulphur emissions and plant odours on J. Lefley's beekeeping and honey extraction operations which are situated at Lsd 5-2-78-6 W6M (5-2), about 0.8 km directly east of Norcen's currently flaring 6-3 central oil battery. J. Lefley indicated that he has conducted his business at this location for the past 10 years, maintains about 3000 hives, and is one of the larger honey producers in the province. He advised that even though Norcen had relocated its proposed plant to 8-34, about 1.6 km south-southwest of his honey extraction facilities, the plant relocation did not fully alleviate his concerns about the possible effects of emissions and odours on honey quality. He indicated that although he could relocate his beehives to areas that were not downwind of any emission sources, he could not relocate the honey extraction warehouse as it is a permanent facility. J. Lefley stated his main concern related to the marketing of his honey product. He indicated that in 8 of the last 10 years he produced the highest grade of honey and had sold his product for full market value, some of it being sold internationally. He stated that with his operation being in close proximity to a sour gas plant, honey inspectors may downgrade the quality of his honey or buyers may defer purchasing his product and this could result in a significant financial loss to him.

With respect to Norcen's literature search and study into the possible effects of $SO_2$ on bees, J. Lefley noted there has not been a significant amount of research on this topic. He indicated that he had approached Norcen and offered to locate some hives near the 6-3 site to be checked by provincial inspectors; however, the applicant had declined. J. Lefley felt that Norcen should have contacted actual beekeepers to determine if there were concerns about possible impacts of sour gas operations on bees rather than the "experts" that the applicant notified.

J. Lefley acknowledged that during the past few years there had been a number of batteries flaring sour solution gas in the Spirit River Field. He further acknowledged that his operation is directly east of the 6-3 central oil battery which is continuously flaring sour solution gas. He agreed that with the relocation of Norcen's proposed plant to 8-34, his honey extraction facilities would then be less affected given the prevailing winds in the area which blow from the west and west-southwest.

### 4.3 Board's Views

With respect to the proposed 8-34 location, the Board accepts it as a satisfactory location within a reasonable distance of the current field operations. It is preferable to the 6-3 site where the central battery is currently located, and is farther removed from residents than any more northerly locations which would be more central to the field.

The Board expects that a central battery will eliminate a number of flares and numerous sources of odours. It will largely reduce heavy oil-hauling truck traffic within the field. In the Board's view, four trucks per week proposed for hauling LPG recovered at the plant does not represent a significant impact. It would expect Norcen to discuss possible routes with the residents.

The Board believes that the proposed incinerator stack will ensure $SO_2$ levels are within Alberta Environment regulations and would provide complete and continuous incineration of the acid gas[3]. This would virtually eliminate $H_2S$ odours which can now result from flameouts or incomplete combustion at battery flares.

The Board notes that the tests and studies on bee behaviour were at $SO_2$ levels much higher than any long-term $SO_2$ concentrations expected near the plant. The location of the plant and battery at 8-34 as well as its extensive control systems would reduce to a very low level the probability of strong odours. Since no adverse effects appear to have resulted from the location of the battery at 6-3, the Board believes that a plant at the proposed location should reduce the probability of odour problems.

## 5 CONSIDERATION OF ALTERNATIVE METHODS OF SULPHUR DISPOSAL

### 5.1 Applicant's Views

### 5.1.1 Processing Options

Norcen stated that if its gas processing application was approved the plant would receive gas containing a maximum of 1916 $m^3$ per day of $H_2S$ (2.6 t/d of sulphur equivalent) contained in the raw solution gas delivered to the plant from the central oil battery. It stated that prior to final plant design, six sulphur handling and disposal options were investigated.

- Norcen stated that it considered processing its gas at the Shell Canada Resources Limited (Shell) Progress plant located in SE 1/4 Sec 1-78-10 W6M. Norcen was informed that processing capacity at Shell's plant could be made available on a best efforts basis only. Norcen did not investigate the feasibility of expanding the Shell plant to accommodate its gas because of the problems and costs associated with the installation of approximately 40 km of sour gas pipeline necessary to transport the gas. Norcen stated that the pipeline costs, process fees, and required compression and dehydration facilities would cost about $4.4 million. The additional pipeline and unfavourable economics made this alternative much less attractive than constructing a new plant in the area of its oil production. Norcen also considered the additional environmental disturbance of land surface (for the pipeline right of way) and the added hazard of a longer sour gas pipeline to be negative aspects of this alternative.

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[3] Acid gas is a mixture of $H_2S$, carbon dioxide, and water vapour removed from the raw gas during processing.

- A second proposal that Norcen considered was the injection of the raw sour solution gas back into the producing formation. This option was rejected since there would be no economic return and the technical feasibility of such a scheme is uncertain. Norcen also stated that the reservoir within the Spirit River Triassic Unit No. 1 does not have a gas cap and injection of solution gas into the oil bearing portion of the reservoir would not enhance oil recovery.

- The third alternative evaluated was the feasibility of injecting the acid gas stream into another subsurface formation. This option was rejected because of the technical problems associated with the dehydration and compression of the acid gas. Additionally, it would not be economic given the capital and operating costs for acid gas compression and sour gas pipelines.

- The fourth option considered was to recover the sulphur by installing a standard Modified Claus sulphur recovery unit. The applicant indicated that the industry has considered that the minimum amount of sulphur production required to economically justify the utilization of sulphur recovery facilities is 5 t/d. Norcen emphasized that its proposed 8-34 plant, operating at maximum rates, would only remove a total of 2.6 t/d of sulphur from the raw gas inlet stream. It said that it was unaware of much documented information about sulphur recovery operations at such low sulphur inlet rates and it was not confident that it could continously operate a Claus sulphur recovery plant at the 2.6 t/d sulphur inlet rate. Norcen added that even though its proposed plant would be rated for an inlet rate of 2.6 t/d, its actual throughput would be somewhat less as gas rates decreased over time. Norcen stated it would cost $1.4 million to install a Claus unit and it concluded that the use of the Modified Claus system was uneconomic.

- Norcen also assessed the feasibility of implementing, at a cost of $1.04 million, the "Lo-Cat" sulphur recovery process which utilizes a liquid catalyst to remove $H_2S$ from the acid gas stream in the form of a sulphur slurry. The applicant said that unlike the Claus unit which would produce marketable elemental sulphur, the Lo-Cat process produces a sulphur slurry which is not as readily marketable. Norcen said that its marketing staff was not able to find a buyer for the Lo-Cat unit's sulphur slurry in its raw form and so rejected this alternative.

- As the sixth option, Norcen proposed that all the $H_2S$ removed from the gas be incinerated and converted to $SO_2$ and emitted to the atmosphere through a 50-m incinerator stack.

### 5.1.2 Incineration

Norcen stated that the acid gas removed by the plant's gas sweetening unit would be burned in an elevated specially designed incinerator which provides for adequate dispersion of $SO_2$. Norcen indicated that sweet fuel gas and air would be mixed with the acid gas stream to provide for complete combustion of the $H_2S$ to $SO_2$. Norcen said that it chose the incinerator because it does not exhibit the problems of incomplete combustion or flame instability commonly found in flares. Normally, a flare burns the gas at the top of a stack and complete combustion is difficult to maintain in the presence of strong winds.

The incinerator flame would be maintained by an incinerator pilot flame, and an electronic pilot ignition that would be energized every 5 seconds in order to maintain the pilot flame at all times. If the ignitor failed to maintain a pilot flame, the acid gas stream would be shut in within 60 seconds to ensure that little $H_2S$ is emitted to the atmosphere. Norcen also advised that during and following plant start-up, it would periodically employ an exit gas monitor on the incinerator to ensure proper air and fuel settings and to verify that the incinerator was operating efficiently and effectively. The applicant stated that a vapour recovery system and a closed flare header system would be installed at the central battery and gas plant to eliminate the possibility of emissions of $H_2S$ and hydrocarbon vapours from oil production tanks, and that all recovered vapours would be routed to the gas plant for processing. All sources of fugitive odours, such as those from the sour water tanks, drain tanks, and dehydrator still column, would be collected in the closed flare header system and sent to the incinerator. Norcen also advised it would design its emergency flare stack (used only during controlled depressuring or process vessels and emergency shut-down situations) to ensure flame stability and it would be equipped with the same flare pilot system utilized by the incinerator.

Norcen stated that prior to selecting acid gas incineration as the preferable sulphur disposal option, it undertook to determine the possible effect that the continuous emission of $SO_2$ may have on air, soil, and water quality in the area.

### 5.1.3 Impacts of Incineration

#### Air Quality

Norcen submitted that it had carried out dispersion calculations using a dispersion model developed by Alberta Environment which accounts for worst-case atmospheric conditions. The calculations demonstrated that ground-level concentrations of $SO_2$ would not exceed the 1-hour average ambient air quality standard. With the proposed gas plant, the applicant stated that the air contaminants emitted would be $SO_2$ from a central facility under controlled conditions and minor amounts of $NO_x$ from the compressors. The model indicated that a maximum $SO_2$ concentration of 0.144 ppm for emissions from the incinerator would occur at a distance of 2000 m downwind of its proposed plant and would be below the present Alberta allowable 1-hour $SO_2$ concentration of 0.17 ppm. Norcen obtained seasonal wind speed and direction frequency distribution from the Grande Prairie Airport which revealed that winds in the area are predominantly from the west.

## Sulphur Deposition

Norcen used a mathematical model, adopted by Alberta Environment, to evaluate the potential effects of $SO_2$ emissions on soil and water, and to predict the pattern and amount of sulphate deposition in the area. The conclusion was that the estimated maximum annual sulphate deposition (wet plus dry) that is presently occurring in the area as a result of the solution gas flaring at the various batteries (and having regard for background sources) is 33.8 kilograms per hectare (kg/ha). Norcen predicted that the maximum annual sulphate deposition resulting from the gas plant would be 24.1 kg/ha over an area of about one hectare in size located about 1.8 km east of the proposed plant's incinerator stack. Norcen compared the 24.1 kg/ha/year to the current guideline level of 40 kg/ha. Norcen stated that the Federal and Provincial Governments have agreed to a guideline of 20 kg/ha/year as a maximum desirable level for the wet sulphate deposition. Norcen indicated that studies involving measured deposition rates suggest that this deposition guideline was designed to be protective of all but the most sensitive aquatic environments and that this limit had also been adopted for Alberta. Norcen said that because measured values of wet and dry deposition have been found to be in the same order of magnitude, an equivalent total annual sulphate deposition (wet plus dry) target would be about 40 kg/ha.

## Soil Tests

Soil tests conducted in the area showed medium to high buffering capacity and Norcen concluded that the plant's predicted total sulphate deposition should have no measurable effect on soil pH (a measure of acidity or alkalinity) or the buffering capacity of the area soils. Although sampling sites were established based on the initial 6-3 site, Norcen stated soil types are consistent in the area and maintained the soil test results are representative of the general area. The applicant stated that to satisfy public concern, it would conduct baseline investigations to determine present soil quality in the vicinity of the proposed plant site prior to plant start-up and establish an on-going soil monitoring program.

Water Quality

Analyses of water samples obtained from dugouts and reservoirs in the area of the proposed plant site indicated that the local surface waters are highly buffered and non-sensitive to acidic inputs. Norcen concluded that emissions from the proposed plant would have no impact on the quality of surface waters in the area but, due to local concerns, agreed to obtain seasonal water samples to characterize existing water quality and establish a benchmark for future water monitoring programs which would be undertaken in consultation with local residents and municipalities.

Norcen concluded that the maximum $SO_2$ emissions from its proposed plant would have no significant impact on local air, water, or soil quality. The results of its air quality analyses indicated that even under worst-case conditions the maximum ground-level concentration of $SO_2$ would be below the allowable concentration set by Alberta Environment. It emphasized that soil and water analyses showed the area soils and water possess a medium to high buffering capacity and neither was found to be sensitive to acidic inputs.

## 5.2 Interveners' Views

The White Mountain Group, J. Lefley, and D. Cairns all stated that as an alternative to the proposed plant, Norcen should pipeline its gas to Shell's Progress plant for processing or inject the sour solution gas into a subsurface formation. They stated that subsurface injection would eliminate the source of emissions and could perhaps enhance oil recovery. They identified projects where such injection schemes had been implemented by other operators in other areas of the province. The White Mountain Group was concerned that the plant emissions could cause serious environmental damage and could adversely affect human health. The White Mountain Group contended that the applicant should bear the cost of containing or recovering the sulphur compounds in the raw gas rather than cause local residents to be subjected to $SO_2$ emissions.

## 5.3 Board's Views

The Board believes that the alternate acid gas processing or disposal options investigated by the applicant are either not economically justifiable or operationally practical compared to the incineration option, recognizing the relatively small volume of sulphur emissions. The Board believes that the 40-km sour gas pipeline required to transport gas to the Shell Progress plant would not be a practical option. In addition, if capacity at the Shell plant was limited, gas may have to be flared at the central battery.

The construction and operation of a sulphur recovery plant for the proposed low volumes of solution gas is, in the Board's view, not practical nor economic in this case. The volumes of gas to be processed would be fluctuating and declining as the reservoir is depleted and would result in serious operational problems. The amount of sulphur recovered by either process would be very small and with the Lo-Cat process no market has been established for the product.

Injection of acid gas as a method of disposal has not been established in Alberta, although some schemes inject acid gas in conjunction with enhanced recovery operations. In this case, the Board believes that the injection of acid gas would be prohibitively expensive and could introduce operational difficulties which might still require frequent flaring.

The Board is satisfied that the applicant's proposal to incinerate the acid gas will result in $SO_2$ levels within Alberta Environment's requirements. It believes that a well designed and controlled incineration system will ensure complete and continuous combustion of $H_2S$ with a low probability of odour problems.

## 6 DECISION

The Board believes that the proposed plant will conserve a significant quantity of natural gas and natural gas liquids, will operate within the province's emission limits set by Alberta Environment, and will not result in significant impacts on nearby residents or the environment. The Board is therefore satisfied with the technical, conservation, and environmental aspects of Norcen's proposal.

The proposed central battery and plant result in a single facility with a network of flow lines to reduce trucking of produced oil and formation water and would largely eliminate sources of odours.

Subject to the receipt of the required approval of the Minister of the Environment with respect to environmental matters, the Board will issue the required approval for the construction and operation of these facilities.

DATED at Calgary, Alberta, on 14 October 1986.

ENERGY RESOURCES CONSERVATION BOARD

Bohme

V. E. Bohme, P.Eng.
Board Member

Bellows

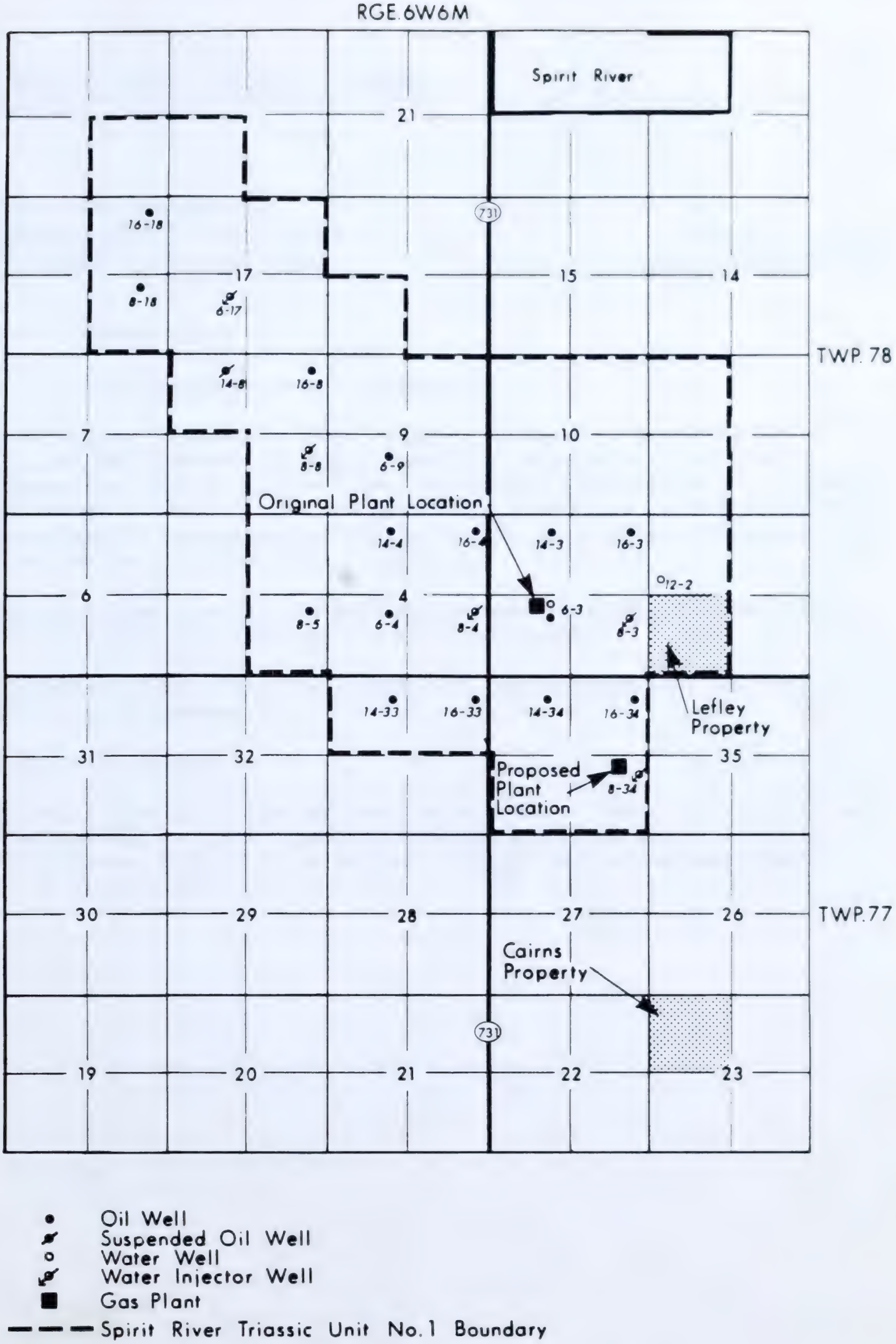
L. A. Bellows, P.Eng.
Board Member

Evans

R. G. Evans, P.Eng.
Acting Board Member

## THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations used in Report) | Witnesses |
|---|---|
| Norcen Energy Resources Limited (Norcen)<br>D. G. Hart, Q.C. | N. A. Addison, P.Eng.<br>J. G. Schopp, P.Eng.<br>D. S. Wood, P.Eng.<br>(all of Norcen Energy Resources Limited)<br>G. L. Latonas<br>C. F. Raynard<br>M. B. Schroeder<br>(all of Western Research and Development) |
| A group of residents comprising the White Mountain Environmental Society (White Mountain Group)<br>J. D. Carter<br>J. Chrenek | C. Holmes |
| J. Lefley<br>J. D. Carter<br>J. Chrenek | J. Lefley |
| D. Cairns<br>J. D. Carter<br>J. Chrenek | D. Cairns |
| Alberta Environment staff<br>F. Witthoeft, P.Eng.<br>O. Dick | |
| Energy Resources Conservation Board staff<br>H. R. Hansford<br>M. Semchuck, C.E.T.<br>R. Florence<br>M. Pittman | |



NORCEN'S PROPOSED SPIRIT RIVER GAS PLANT AND SURROUNDING AREA

APPLICATION 860590

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

GULF CANADA CORPORATION
APPLICATION FOR A WELL LICENCE
ST. ALBERT - BIG LAKE FIELD

Decision D 86-13
Application 860749

# 1 INTRODUCTION

## 1.1 The Application and Interventions

Gulf Canada Corporation (Gulf) applied pursuant to section 2.020 of the Oil and Gas Conservation Regulations (the Regulations) for a well licence to drill a well in legal subdivision 1 of section 24, township 53, range 26, west of the 4th meridian, to be known as GULF ET AL STAL 1-24-53-26. The purpose of the well would be to obtain oil production from the Leduc and/or Nisku Formations.

Interventions opposing the application were filed by Big Lake Farming Co. Ltd. (Big Lake Farming) and Mr. R. Kendrick.

The attached map shows the location of the proposed well and the adjoining landowners.

## 1.2 The Hearing

A public hearing of the application was held in Edmonton, Alberta, at the Mayfield Inn on 6 August 1986 before Board Members V. E. Bohme, P.Eng., L. A. Bellows, P.Eng., and Acting Board Member J. A. Bray, P.Eng.

THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Gulf Canada Corporation (Gulf)<br>D. Gandar<br>J. Kowch | R. Corvari<br>R. Grant<br>J. Hemstock, P.Eng.<br>D. Lovatt, P.Geol.<br>B. McClure, P.Eng.<br>B. Plesiuk<br>N. Rubeniuk<br>M. Smith<br>M. White |
| Big Lake Farming Co. Ltd. (Big Lake Farming)<br>R. A. Speidel | Dr. F. G. Day<br>S. Murray, P.Eng. |
| Energy Resources Conservation Board staff<br>H. R. Hansford<br>D. K. Boyler<br>N. F. Lord | |

Mr. R. Kendrick did not appear at the hearing to speak to his intervention.

## 2 THE ISSUES

The Board considers the issues with respect to the application to be

- the need for the well,
- the location of the well, and
- the impact of the well during drilling and production phases.

## 3 PROCEDURAL MATTERS

During its presentation of direct evidence, Big Lake Farming questioned certain aspects of Gulf's drilling program. Gulf undertook to provide written answers to the questions to the Board and the intervener within 1 week of receipt of the record of the hearing. Big Lake Farming undertook to provide the Board with its comments on Gulf's answers within 2 weeks after receiving this document from Gulf.

The Board will review the submissions from Gulf and Big Lake Farming and if a well licence is issued, would require that Gulf's drilling program be acceptable to the Board prior to spudding the well.

## 4 VIEWS OF GULF

Gulf submitted that it had the right to explore for and produce the reserves which it believed underlie the southeast quarter of section 24, township 53, range 26, west of the 4th meridian (Sec 24), by virtue of an Alberta Crown petroleum and natural gas lease.

Gulf established the proposed well's location based on seismic information which indicated a possible oil-bearing Leduc pinnacle reef structure of limited areal extent. Based on this geologic interpretation, Gulf believed the proposed well's location had to be very close to the structure indicated by the seismic data. As a secondary prospect in the proposed well, Gulf anticipated encountering the Nisku overlying the Leduc reef structure, also thought to be oil bearing.

Based on available data in the area, Gulf expects that potential producing zones of interest may both contain hydrogen sulphide ($H_2S$), (1.25 per cent and 3.17 per cent for the Leduc and Nisku respectively). On the basis of estimated $H_2S$ release rates of 0.009 cubic metres per second and 0.006 cubic metres per second for the Leduc and Nisku, Gulf had calculated an emergency planning zone (E.P.Z.) of 130 metres (m). Having regard for the well's location within the western boundary of the Edmonton city limits and the number of persons residing near the well, Gulf had expanded the E.P.Z. to 500 m. In further recognition of the sensitivity of the area, Gulf was prepared to undertake additional safety precautions while drilling the proposed well. These would include air quality monitoring equipment positioned at the nearest downwind residence; a portable wind direction monitor; the contracting of safety consultants to ensure all on-site personnel were trained in $H_2S$ operations and the use of breathing apparatus; the installation of $H_2S$ and explosive gas monitoring equipment in strategic locations on the rig; and a safety trailer to be located on the lease. Gulf proposed the use of portable radios on the rig and by key personnel to ensure rapid communication should a mishap occur. Further, personal $H_2S$ and gas detection units and a well ignition kit would be utilized if required.

Should the well discover economically recoverable hydrocarbons, Gulf acknowledged that the presence of a well and related production facilities could have an impact on the surrounding area. It was Gulf's opinion, however, that the concerns of Big Lake Farming as set out in its intervention have been addressed either voluntarily by Gulf or by accommodating the conditions imposed by the City of Edmonton and by adhering to ERCB regulations.

Moreover, once a production rate had been established for the proposed well, Gulf would continue discussions with area residents to address any concerns which could arise. Gulf submitted that it was familiar with the Board's West Edmonton Inquiry Report[1] and the general principles recommended by the ERCB would be taken into account during any facility design and operation.

In summation, Gulf submitted that mineral reserves should be depleted as quickly as possible so that the anticipated residential population increase could be accommodated with a minimum of conflict.

## 5 VIEWS OF BIG LAKE FARMING

Big Lake Farming, owner of the south half of section 19, township 53, range 25, west of the 4th meridian, stated it did not dispute Gulf's right to recover the minerals in the drilling spacing unit. Big Lake Farming did, however, question the economic viability of the well, given the present price of oil.

It was Big Lake Farming's submission that there was no alternative site within the drilling spacing unit which would alleviate its concerns and therefore the application should not be granted.

Big Lake Farming submitted that its experience with oil operations in the area was the reason for many of the concerns raised with Gulf's proposal. The intervener submitted that it had concern for the negative impact of odours, noise, increased traffic, flaring of gas, damage to roads, and the potential risk of an $H_2S$ release. Also, these impacts would result in devaluation of the property which Big Lake Farming plans to develop into a country-residential subdivision; however, Big Lake Farming did not have a defined time frame in which this was to take place. Big Lake Farming claimed the proposed drilling and completion program for the well did not provide the best protection against a release of the $H_2S$ and recommended many revisions to the program to make it safer.

Big Lake Farming submitted that if the ERCB decided to approve the application, it would be satisfied if the impacts set out in its submission were properly addressed. In addition to the six points it raised, Big Lake Farming also requested that any permanent facility be fenced. Big Lake Farming was not satisfied, however, with a verbal commitment from Gulf to address its concerns and stated that it would be more reassured by a written commitment from Gulf or by the inclusion of conditions on any licence issued by the Board.

## 6 VIEWS OF THE BOARD

The Board notes that the applicant has the right to explore for minerals in the subject drilling spacing unit. The Board is satisfied that there is a need to drill the well to determine if hydrocarbon reserves are present.

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[1] ERCB Inquiry Report D 83-F Resources Development/Urban Development, West Edmonton Area.

The Board agrees that the well should be located directly over the indicated seismic anomaly and since the intervener did not propose any alternative location, the Board accepts Gulf's proposed well location.

With respect to the drilling and producing phases of the well, the Board is satisfied that the measures proposed by Gulf would permit the well to proceed in a safe manner and without significant impact on the area residents.

The Board notes and accepts Gulf's undertaking to follow the guideline set out in the West Edmonton Inquiry Report.

The Board further notes Gulf's commitment to discuss the production phase of the well with the area residents once the well has been tested and the need for a production scenario established. With respect to the production phase, the Board notes that this is a matter of a future application. However, the Board, in recognition of the Inquiry Report and other oil and gas activities in the subject area, endorses the concept of pipelining the well's production to a central facility rather than establishing single well batteries.

## 7 DECISION

The Board is satisfied that the drilling of the well would not result in significant impacts on nearby residents or on the City of Edmonton.

The subject application is therefore approved and a well licence will be issued in due course, subject to the condition that the Board is satisfied with the drilling plan prior to spudding the well.

DATED at Calgary, Alberta, on 28 August 1986.

ENERGY RESOURCES CONSERVATION BOARD

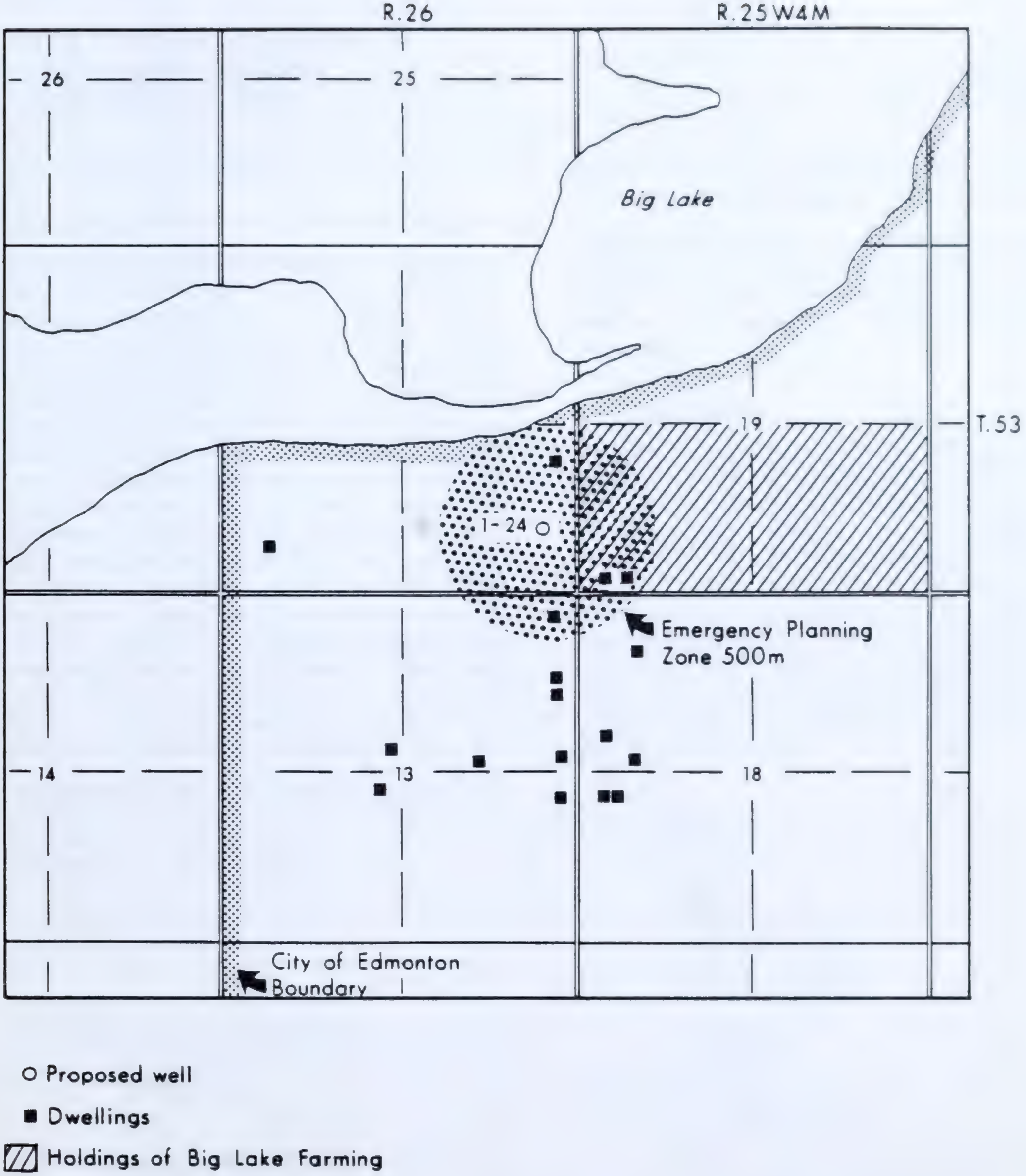
VE Bohme

V. E. Bohme, P.Eng.
Board Member

LA Bellows

L. A. Bellows, P.Eng.
Board Member

J. A. Bray, P.Eng.
Acting Board Member


R.26
R.25W4M
26
25
Big Lake
19
T.53
1-24
Emergency Planning Zone 500m
14
13
18
City of Edmonton Boundary
○ Proposed well
■ Dwellings
▨ Holdings of Big Lake Farming

PROPOSED WELL GULF ET AL STAL 1-24-53-26.
Application 860749

# ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

# GULF CANADA CORPORATION COMPULSORY POOLING CHEDDERVILLE AREA

**Decision D 86-14**
**Application 860072**

## 1 INTRODUCTION

### 1.1 Application

Gulf Canada Corporation (Gulf) applied, pursuant to section 72 of the Oil and Gas Conservation Act, for an order designating that all tracts within the drilling spacing unit comprising section 21, township 37, range 7, west of the 5th meridian (section 21), be operated as a unit for gas production from all zones down to the base of the Leduc Formation in a well proposed to be drilled in legal subdivision 14. The applicant proposed that the allocation of costs and revenues to each tract be on an area basis with 50 per cent to the west half and 50 per cent to the east half of section 21, and, that the penalty for late payment of a tract's share of drilling and completion costs be 50 per cent of the tract's share of such costs. The applicant requested that the unpaid portion of a tract's share of drilling and completion costs plus the penalty be subject to an interest charge of prime rate plus one per cent per annum. The applicant also requested that it be designated operator of the well resulting from the pooling order, and, that each tract owner be responsible for the taking in kind or selling of its share of production.

Gulf holds the mineral rights in the east half of section 21 and Esso Resources Canada Limited (Esso) is the major interest holder in an eleven-company consortium holding the mineral rights in the west half of the section.

### 1.2 Interventions

Interventions opposing the application were submitted by Esso, Many Islands Pipe Lines (Canada) Limited, Home Oil Company Limited, Canadian Occidental Petroleum Limited, Camel Oil & Gas Limited, Paloma Petroleum Limited, ICG Resources Limited, Mobil (CSOL) Oil Canada Limited (Mobil), Mont Resources Limited, Precambrian Shield Resources Limited, and Canterra Energy Limited (Canterra). Esso and Canterra appeared at the hearing to speak to their interventions, with Esso representing all west half owners excluding Canterra. Mobil appeared at the hearing but did not speak to its intervention.

## THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Gulf Canada Corporation (Gulf)<br>D. J. Gandar | A. T. Martin<br>D. P. Carey, P.Eng.<br>B. L. Illing, P.Geol.<br>G. J. Macey, P.Geol. |
| Esso Resources Canada Limited (Esso)<br>R. C. Pittman<br>S. McCormack | K. W. Young<br>E. C. Blakely<br>R. M. Fish, P.Eng<br>J. C. Wendte, P.Geol. |
| Canterra Energy Limited (Canterra)<br>C. P. McDonald | |
| Mobil (CSOL) Oil Canada Ltd. (Mobil)<br>L. R. Tillman | |
| Energy Resources Conservation Board staff<br>H. R. Hansford<br>V. J. Vogt<br>D. G. Hass, E.I.T.<br>N. Nastasa<br>T. K. Wong, P.Geol. | |

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### 1.3 Hearing

The application was heard on 25, 28, and 29 July 1986 at a public hearing held in Calgary, Alberta, before a Board panel comprising V. Millard, N. A. Strom, P.Eng., and J. R. Pow, P.Eng.

## 2 ISSUES

The Board considers the issues to be,

- the need for a compulsory pooling order and the inability of the tract holders to reach a voluntary pooling agreement;
- the allocation to each tract of its share of the costs and revenues associated with the production of gas from a well drilled in section 21 and, in this regard, the distribution of gas reserves in the Leduc and Viking Formations within the section;
- the zones to be included in the pooling order;
- the period of time provided for which to drill a well after receipt of the order;
- the penalty for late payment of a tract's share of drilling and completion costs and the period of time after which it would be assessed; and
- the taking in kind or selling of a tract holder's share of production.

## 3 CONSIDERATION OF THE APPLICATION

### 3.1 Gulf's Position

In September 1985, Gulf forwarded a pooling proposal to the partners in the west half of section 21 (Esso et al). Gulf proposed pooling on an area basis, with a well to be drilled in Lsd 14. Esso et al rejected the proposal, particularly the proposed well location, on the basis that it was inequitable. Although meetings were continued into April 1986, the parties were unable to reach a voluntary pooling agreement and Gulf therefore applied to the Board for a pooling order.

Gulf maintained that pooling on an area basis would be equitable because it interpreted the Leduc reef to be gas-bearing under a southern portion of section 28-37-7 W5M and all of section 21 (see Figure 1) with the reserves in the west and east halves of the section about equal. Gulf's geological interpretation of the Chedderville D-3 A pool was based on seismic coverage within and adjacent to section 21 and on geological evidence derived from the wells in Lsd 4-22-37-7 W5M and Lsd 10-29-37-7 W5M (4-22 and 10-29 wells).

Gulf indicated that if the terms for a pooling order allowed Gulf less than a 50 per cent share of production, then it would have to give further consideration to its plans to drill a well. However, Gulf added that if it did drill the well, it would be prepared to drill a well within six months of receipt of a pooling order, unless the well was designated as a critical sour well, whereupon it could be delayed by up to one year before the well would be drilled.

In reply to questioning, Gulf agreed to the exclusion of the oil-prone Cardium Formation and did not object to confining the order to the Leduc and Viking Formations.

Gulf wished the penalty for late payment be applied to a tract holder's share of drilling and completion costs if the tract owner does not pay his proportionate share within 30 days of receipt of a statement of such costs.

### 3.2 Esso's Position

Esso rejected Gulf's proposal for pooling on the basis of tract area because it regarded such a distribution as inequitable. Esso's position, based primarily on seismic interpretation, was that the Chedderville Leduc reef is not present under the east half of section 21, and it argued that drilling a well in Lsd 14 of section 21 would do nothing to prove Gulf's interpretation of Leduc reserves in the east half of the section. However, if Gulf drilled a well in the east half of section 21, Esso would be willing to participate in a voluntary pooling agreement based on the information then available.

Based on an analogy to the Redwater Leduc reef, Esso divided the Chedderville Leduc reef into three informal members: the Lower, Middle, and Upper Leduc. Esso interpreted the cored interval in the 10-29 well to be part of the Lower Leduc Member, and noted that this member is not gas bearing in the Chedderville D-3 A reef. In this interpretation, Esso contended that the cored interval could not be used as an indicator of close proximity to the gas-bearing Upper Leduc reef margin. Esso also interpreted the same geological setting for the 4-22 well. Esso's delineation of the edge of the pool was based on seismic surveys.

Esso submitted that if a pooling order were issued, only the Leduc and Viking zones should be included since those are the only known gas zones in the area.

Esso agreed with Gulf that a 30-day period before assessment of a penalty for late payment of drilling and completion costs was reasonable. However, Esso indicated that a penalty in the form of interest would be sufficient.

Esso concurred that Gulf be designated as operator of any resultant well, and requested that Esso be given the option to have Gulf, as operator, dispose of Esso's share of production due to market constraints.

### 3.3 Canterra's Position

Canterra supported Esso's position and technical interpretation. It agreed that a well should be drilled in the east half of section 21 to demonstrate that reserves exist in that part of the section.

### 3.4 Views of the Board

The Board heard evidence of Gulf's attempts to reach a voluntary pooling agreement and concludes that it was unsuccessful because the owners of the two tracts have such divergent views respecting whether the east half of section 21 does have gas reserves in the Leduc Formation. A second serious impediment was Gulf's proposal to drill its well on the west half of the section.

Not only did those factors prevent voluntary pooling but they have a major impact on the basis for sharing production and costs in any pooling order that might be issued. Because Gulf determined that the east half has productive reserves that are essentially equal in volume to those on the west half, it advocated pooling based on the respective acreage shares of each owner in the section. In contrast, Esso interpreted the east half as being barren of gas reserves and therefore contended that Gulf should not receive any share in the production of a well drilled in the west half.

The Board has carefully reviewed each of the interpretations of productive Leduc reef. It cannot find evidence to support one interpretation more than the other and therefore concludes that each is plausible. Having regard to Esso's interpretation, if a well were drilled in the west half of the section, it would not demonstrate the existence of reserves in the east half, and therefore, an allocation based on area would be inequitable.

An equitable allocation depends upon determining, as close as possible, the actual location of the reef edge. Proof of reef presence is demonstrated by drilled productive wells which, at present, are limited to the wells in Lsd 10-20-37-7 W5M and 16-19-37-7 W5M. Proof that the reef is not present is provided by abandoned wells of which there are three: 10-29, 7-28, and 4-22-37-7 W5M.

Each of the parties agrees that the reef edge is not located east of section 21. The only question is whether it is located within the west half of the section, as postulated by Esso, or is near the east boundary of the section, as postulated by Gulf. If it is confined to the west half, then Gulf is not entitled to a share of any production, but if it extends well into or beyond the east half, then Gulf is entitled to a share of up to 50 per cent of the production. The Board also recognizes the possibility of the reef edge being located in the area between those two interpretations and believes that in the interest of equity it must have regard for that possibility.

The Board believes that these principles can be embodied into a sharing formula that prescribes three corridors within the section. The western corridor extends from the western boundary of the drilling spacing unit to a north-south line lying 200 metres west of a north-south line bisecting section 21. The eastern corridor extends from the eastern edge of the drilling spacing unit to a north-south line lying 200 metres east of a north-south line bisecting section 21. The central corridor comprises the lands lying between the other two corridors. The corridors are shown in Figure 1.

Because a well drilled in the western corridor could not demonstrate the presence of gas in the east half of the section, the Board has concluded that the sharing of production from a well drilled in that corridor should be

| | |
|---|---|
| West half | 100 per cent |
| East half | 0 per cent |

A successful well drilled in the eastern corridor would demonstrate the presence of gas over much of the east half of the section and therefore the sharing of production from a well drilled in that corridor should be

| | |
|---|---|
| West half | 50 per cent |
| East half | 50 per cent |

The sharing formula for a well drilled in the central corridor must recognize the incremental information obtained at various locations within the corridor. For example, a well drilled near the eastern edge of the central corridor would provide substantial information about the presence of gas in the east half. The Board, therefore, has subdivided the central corridor into four 100-metre wide strips identified in Figure 1 as Strips A, B, C, and D. The percentage sharing of production from each strip would be

| Strip | A | B | C | D |
|---|---|---|---|---|
| West half | 90 | 80 | 70 | 60 |
| East half | 10 | 20 | 30 | 40 |

In summary, the Board concludes that there is a need for a pooling order and that Gulf should be named operator of the subsequent well.

The Board concludes that the gas-bearing Viking Formation should be included in the pooling order. Since the basis for allocation of production from the Viking Formation was not disputed by the participants, the Board concludes that allocation on an area basis is equitable.

For production from the Leduc Formation the allocated tract shares should be tied to the location of the well within the corridors as previously described. The bottom hole location of the well, as defined by a directional survey, rather than the surface location, must be used when determining the position of the well relative to the corridors or strips.

Allocation of costs for the well is to be on the same basis as the allocation of production, depending on the zone of completion and drilling location. Gulf would, however, pay the costs of drilling and abandoning the entire well if it is unproductive of gas in both the Viking and Leduc Formations, or it would pay the costs of drilling and plugging off the portion of the well below the Viking Formation if it is productive of gas in that formation only.

The Board acknowledges that a well in section 21 may be licensed as a critical sour well and believes that Gulf should be given 12 months from the issuance of the order to drill a well.

With respect to drilling and completion costs, the Board notes that the 50 per cent penalty plus interest exceeds that permitted under section 72(5) of the Oil and Gas Conservation Act. The Board notes, however, that the operator will assume a risk in drilling the well, and therefore concludes that the application of a 50 per cent penalty is appropriate. Furthermore, the Board believes that the penalty should be applied if an owner of a tract fails to pay its share of the drilling and completion costs within 30 days of receipt of the statement of costs.

The Board believes that the onus for dispensation of production lies with the operator. Consequently, each tract holder has the option to take in kind his share of production or have the operator sell it for him.

## 4 DECISION

The Board, subject to the approval of the Lieutenant Governor in Council, is prepared to issue an order specifying that

- all tracts within section 21 of township 37, range 7, west of the 5th meridian be operated as a unit to permit the drilling for and production of gas from the Leduc and Viking Formations;
- Gulf Canada Corporation be designated as operator of the proposed well and be responsible for all completion, production, and abandonment operations at the well;
- the allocation of costs and revenues be as follows:
  - —for the Viking Formation, the share being in the same proportion to the whole of the production of the drilling spacing unit as the area of the tract is to the total area of the drilling spacing unit, and
  - —for the Leduc Formation, the share being in the proportion of
    - (i) 100 per cent of the whole of the production to the west half of section 21 and 0 per cent of the whole of the production to the east half of section 21 if the well is drilled a distance greater than 200 metres west of the north-south line bisecting section 21,
    - (ii) 90 per cent of the whole of the production to the west half of section 21 and 10 per cent of the whole of the production to the east half of section 21 if the well is drilled a distance greater than 100 metres but no more than 200 metres west of the north-south line bisecting section 21,
    - (iii) 80 per cent of the whole of the production to the west half of section 21 and 20 per cent of the whole of the production to the east half of section 21 if the well is drilled a distance west but no more than 100 metres west of the north-south line bisecting section 21,
    - (iv) 70 per cent of the whole of the production to the west half of section 21 and 30 per cent of the whole of the production to the east half of section 21 if the well is drilled a distance less than 100 metres east of the north-south line bisecting section 21, including that north-south line,
    - (v) 60 per cent of the whole of the production to the west half of section 21 and 40 per cent of the whole of the production to the east half of section 21 if the well is drilled a distance less than 200 metres but no less than 100 metres east of the north-south line bisecting section 21,
    - (vi) 50 per cent of the whole of the production to the west half of section 21 and 50 per cent of the whole of the production to the east half of section 21 if the well is drilled a distance of 200 metres east or greater from the north-south line bisecting section 21;

- Gulf Canada shall drill the well within 12 months of the date of the order;
- if an owner of a tract fails to pay his share of drilling and completion costs within 30 days of the later of the issuance of the order or receipt of the statement of costs, a penalty of 50 per cent of the unpaid amount be awarded to the applicant.

DATED at Calgary, Alberta, on 21 August 1986.

ENERGY RESOURCES CONSERVATION BOARD

V. Millard
Chairman

N. A. Strom, P.Eng.
Board Member

J. R. Pow, P.Eng.
Acting Board Member

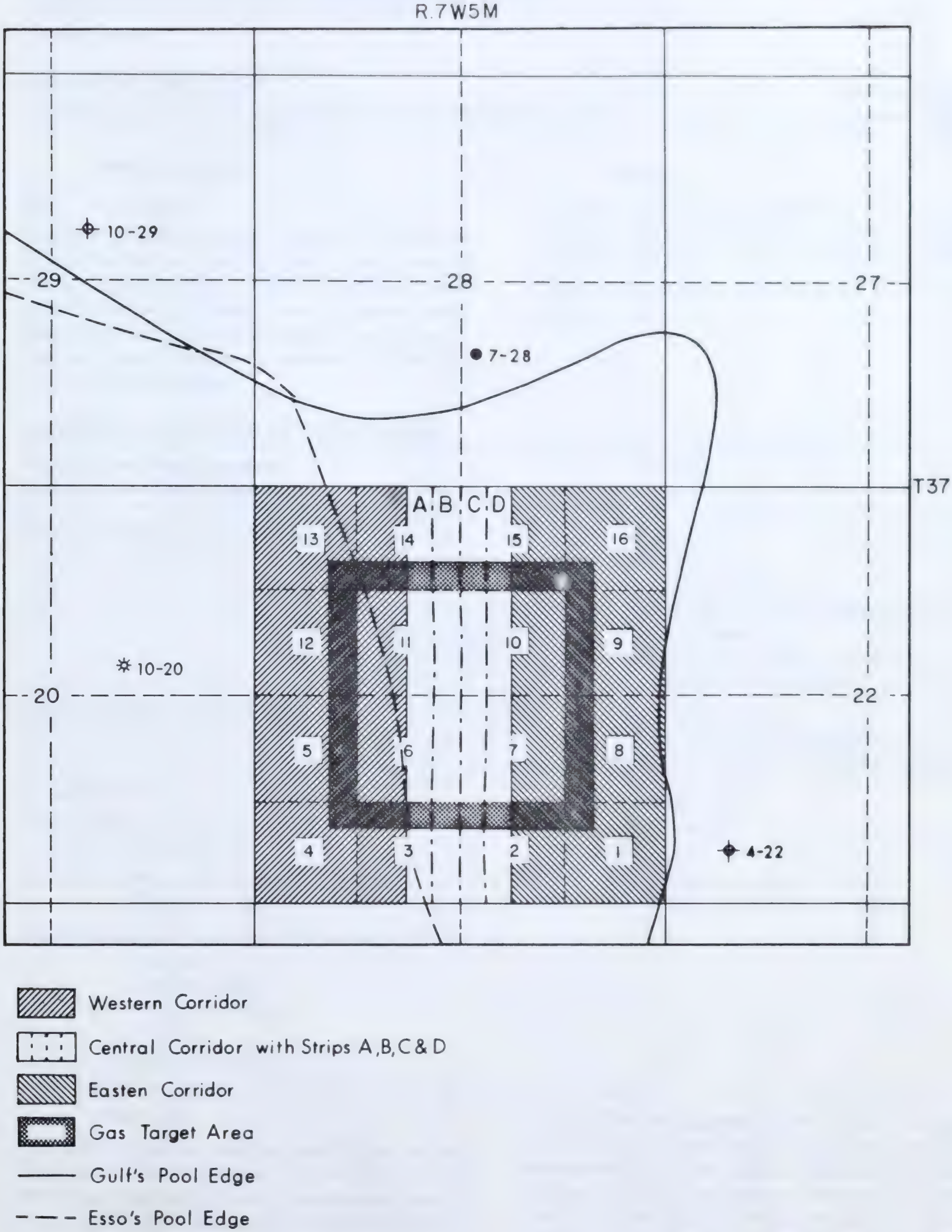

FIGURE 1 SECTION 21-37-7W5

## ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

## TOWN OF OKOTOKS
## PURSUANT TO SECTION 34 OF THE PIPELINE ACT

**Decision D 86-15**
**Application 860281**

### 1 INTRODUCTION

### 1.1 Application

The Town of Okotoks requested, pursuant to section 34 of the Pipeline Act, that the Board direct Canterra Energy Ltd. (Canterra) to locate an emergency shutdown (ESD) valve on Canterra's existing pipeline, northeast of its existing Okotoks gas plant, at approximately legal subdivision 9 of section 35, township 20, range 29, west of the 4th meridian.

### 1.2 Hearing

A public hearing of the application was held on 20 August 1986 in Calgary with G. J. DeSorcy, P.Eng., C. J. Goodman, P.Eng., and V. E. Bohme, P.Eng., sitting.

Those who appeared at the hearing are shown in the following table.

### THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Town of Okotoks (the Town)<br>G. F. Dixon | R. Scotnicki<br>W. Wylie<br>D. Billings, P.Eng.<br>G. Sokolan (of Calgary Regional Planning Commission)<br>M.J.E. Davies, P.Eng. (of Concord Scientific Corporation) |
| Canterra Energy Ltd. (Canterra)<br>C. H. Morel | L. Fenwick, P.Eng.<br>A. M. Hay (of CEP Consultants (1985) Ltd.)<br>Dr. D. M. Leahey (of Western Research) |
| H. Alger, MLA | H. Alger, MLA |
| Calgary Regional Planning Commission<br>I. Robinson | I. Robinson<br>B. Koch |
| Municipal District of Foothills No. 31 (M.D.)<br>J. Pashniak, P.Eng. | J. Pashniak, P.Eng. |
| Energy Resources Conservation Board staff<br>A. Gervais<br>A. Cassley, P.Eng.<br>N. C. Harris, P.Eng.<br>C. McKay<br>W. Thorne, P.Eng. | |

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### 1.3 Background

The existing pipeline from the Canterra gas plant to the existing ESD valve located at 13-26-20-29 W4M, as shown on the attached figure, is classified as a Level 2 sour gas facility[1] according to ERCB Interim Directive ID 81-3. The existing pipeline that extends northeast from this valve is classified as a Level 4 pipeline. The recommended minimum setback distances from these pipeline segments to an urban centre or public facility are 500 metres and 1500 metres respectively. These separation distances cover a major portion of land located in the north half of section 27 and the south half of section 34-20-29 W4M.

The installation of the applied-for ESD valve would reduce the segment of pipeline between the existing

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[1] The level of sour gas facilities is based on the maximum amount of hydrogen sulphide ($H_2S$) which could be released in the event of an accident.

ESD valve and the proposed valve to a Level 2 facility and also reduce the segment extending to the northeast of the proposed valve to a Level 3 facility. The recommended setbacks, from an urban centre or public facility to these two segments, would then be a minimum of 500 metres and 1500 metres respectively, thereby reducing the setback area to smaller portions of sections 27 and 34-20-29 W4M.

Prior to the subject hearing before the Energy Resources Conservation Board (the Board) to consider its request for an ESD valve, the Town presented arguments at a Local Authorities Board public hearing, held on 17 April 1985, to have portions of the north half of section 27 and south half of section 34-20-29 W4M annexed to the Town.

The Local Authorities Board also heard arguments from the Calgary Regional Planning Commission (CRPC), the Municipal District of Foothills No. 31, Alberta Environment, Alberta Agriculture, and Canterra, all of whom were opposed to the proposed annexation.

The Local Authorities Board decided that the application by the Town was premature and it was refused. Two aspects of the Local Authorities Board decision in Board Order No. 17782 dated 8 May 1985 can be summarized as follows:

(a) Lands currently exist within the Town's boundary that are viable for development.

(b) A major portion of the proposed annexation territory encroaches on land within setbacks for existing sour gas facilities in the area, and so urban development should not be permitted in these zones of constraint.

The Town by its application to the Board wished to address the sour gas constraints.

## 2 ISSUES

The Board considers the issues regarding the application to be

- the need in the public interest for the ESD valve in the present situation,
- the need in the public interest for the ESD valve to accommodate a future situation, and
- the allocation of costs if an ESD valve is found to be needed.

## 3 NEED IN THE PUBLIC INTEREST FOR THE ESD VALVE IN THE PRESENT SITUATION

Mayor Wylie of the Town expressed some concern for the present safety of residents of Okotoks nearest to Canterra's facilities. However, he maintained that the main reason this application was before the Board was to provide for a future situation by removing a restraint from the lands in sections 27 and 34-20-29 W4M, on which a developer is willing to proceed with development. The proposed development would provide amenities to the townspeople and would improve the financial situation of the Town by expanding the tax base.

Concord Scientific Corporation (Concord), on behalf of the Town, analysed the risk analysis produced for Canterra by Western Research and concluded that the present risks to the residents of the Town were similar to those from other sour gas facilities in Alberta and were less than those generally accepted by society.

Canterra maintained that residents within the present Town boundary were not at risk from its current facilities. It pointed out that the plant and pipeline have operated safely since 1959. Canterra therefore believed that there was no need for an additional ESD valve to ensure the safety of the current residents.

The Board believes that the risks to the residents of the Town arising from Canterra's facilities are less than those generally accepted by society at large. Therefore the Board does not believe that there is an immediate need, on the basis of the existing situation, for an additional ESD valve.

## 4 NEED IN THE PUBLIC INTEREST FOR THE ESD VALVE TO ACCOMMODATE A FUTURE SITUATION

The Town stated that it believes it should have the right and the ability to direct and control its future destiny within appropriate regulations. It stated that although it is difficult to encourage commercial and industrial development and standard residential subdivision in a small community in the present economic times, it foresees a niche in the marketplace for a lower density and more expensive level of housing and a recreational style of development.

The Town indicated that the developers presently holding lands within its boundaries did not show any interest in developing them in the near future. It stated that it believes that the proposed development would reduce the financial debt of the Town and the level of taxation for its residents. It further indicated that a favourable decision by the Board regarding the ESD valve would strengthen its case for annexation to the Local Authorities Board.

Concord stated that it had examined the Western Research report and risk assessments done for other sour gas facilities, and concluded that the risk after installation of the proposed valve and with the reduced setback distance would be comparable to that under the present situation, and in both cases would be at levels generally accepted by society.

Mr. Alger, the MLA for the Highwood constituency, supported the application by the Town and stated that he considered the development to be very valuable in assisting the economic growth of the Town.

Canterra indicated that the other developers holding land within the Town were contacted and questioned regarding the development of their lands. It found the general consensus to be that if there was a demand in the market and an adequate economic return, then the developments would proceed; but that currently none saw an immediate need to proceed with development. Canterra argued that further annexation to the Town was unnecessary until the vacant lands within the Town were filled. Canterra maintained that although it had no objection to the ESD valve itself, it opposed the development of residences close to its facilities for safety reasons.

Dr. Leahey, on behalf of Canterra, presented information suggesting that the installation of the valve and residential development of lands adjacent to the reduced setback zone would place those residents at a slightly greater risk than would be the case if the valve was not installed and development took place up to the presently existing setback zone.

The M.D. pointed out that under the present boundary situation the population would not change because the proposed development is on land which is reserved for agricultural purposes. Subdivision is not allowed on such lands; however, a co-operative development with the Town might be an alternative that it could consider. The M.D. took no position on the need for the valve.

The Board believes that the assessment of the Town's application should address the following questions respecting a possible future situation:

- Would the proposed scenario be acceptable from a safety viewpoint?
- Would it be substantially less safe than in the present situation?
- Is there a need for the residential development referred to by the Town?

While the Board may not necessarily agree with all of the assumptions used by the risk experts that appeared at the hearing, it is satisfied that the risks at the calculated setback distances, both before and after installation of the ESD valve, would be less than risks generally accepted by society. They would also be at a level which the Board would find acceptable. It therefore concludes that if the valve was installed, and subject to details of planning[2], the area in portion of the north half of section 27 and south half of section 34-20-29 W4M could be developed.

The Board is also satisfied that there would be little difference in the risk that would exist in the present or proposed situation if in both cases residential development proceeded to the maximum allowed by the setback restraints.

With respect to the question of need for the residential development, the Board is generally of the view that the Town, subject to adherence to planning laws and regulations, should be able to plan its growth pattern over a long term. Similarly, landholders who are prepared to proceed with developments should be free to do so, provided they follow the laws. In any case, the Board does not believe it is the appropriate body to be passing judgement as to whether there is a need for development of the lands in question, and in fact, is not certain it would have jurisdiction to do so.

Having concluded that developments would be feasible if the valve existed, the Board must then consider whether, in the situation where developments were approved and about to proceed, it would direct the installation of the valve in the face of opposition from the operator of the facilities. Having regard for the earlier conclusions regarding safety and the restrictions which the existing sour gas facilities impose on the development potential for lands whose owners do not directly benefit from the sour gas operations, the Board would be prepared to make such a direction.

The Board recognizes that the above stated conclusion, coupled with the position taken by the Local Authorities

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[2] If the valve was installed and development proceeded, the Board would encourage the Town to take into account the proximity of the sour gas facilities when planning the proposed development by arranging for higher concentrations of population to be kept as distant from the facilities as is reasonably practical.

Board, could result in a "chicken and egg" situation for the Town and potential developers of the lands in question. For this reason, the Board has decided that it will direct that the valve be installed, but will make it subject to conclusions, by those with the appropriate jurisdiction, that the residential developments should proceed.

## 5 COST ALLOCATION

The Town stated that it believes Canterra should pay for the ESD valve as Canterra's operations were responsible for the setbacks and the consequent sterilization of the land for development purposes. It also stated that it was flexible with regards to the timing of the valve installation and expected it to take place during periodic plant shut-downs for maintenance purposes.

Canterra stated that it would not receive any benefits from the installation of the ESD valve. It believed that as the Town would benefit by way of developments, the Town should pay for the valve. Canterra indicated that if the valve was to be installed, the least economic disturbance would be caused if it was installed during the scheduled plant shut-down period.

The Board believes that the main beneficiary of the valve installation would be the Town. It believes that Canterra may benefit minimally from the reduction in the volume of sour gas which could be released as it relates to emergency planning, and perhaps in increased control of its pipeline operation. Therefore, if the valve were to be installed, the Board would direct that the Town pay for it, but that Canterra be responsible for on-going maintenance. The installation would take place during a regularly scheduled plant shut-down.

## 6 SUMMARY AND DECISION

The Board does not believe that there is an immediate need for the installation of a valve. However, it recognizes that development of the Town could take place and the risk from the pipeline to the future occupants of lands developed would be reduced to an acceptable level if the valve was to be installed. Consequently, and so that the Town may proceed with proposals for development to the appropriate authorities, the Board believes that it would be in the public interest to order the installation of the valve, subject to certain conditions ensuring that it is not prematurely and unnecessarily installed.

The Board will order that an emergency shut-down valve be installed on the Canterra pipeline at or about Lsd 9-35-20-29 W4M. The order will be conditioned as follows:

1. The valve shall be installed when requested by the Town, but not before the lands in question, namely the north half of section 27 and the south half of section 34-20-29 W4M, or a significant portion of them, have been approved for residential type developments.
2. The valve shall be installed coincidentally with and during a scheduled Canterra plant maintenance shut-down.

With respect to costs the Board will direct that

1. the costs of the valve and initial peripheral equipment necessary for its operation, as specified by Canterra and approved by the Board, and the installation thereof, shall be paid by the Town;
2. the costs of any compensation payable to the landowner due directly to the installation of the valve shall be paid by the Town;
3. the costs of construction of an access road to the valve site from the nearest point of accessibility shall be paid by the Town;
4. the costs of the leasing of land necessary for an access road and valve site shall be paid by Canterra;
5. the costs of operating and maintaining the valve shall be paid by Canterra.

DATED at Calgary, Alberta, on 7 October 1986.

ENERGY RESOURCES CONSERVATION BOARD

G J DeSorcy

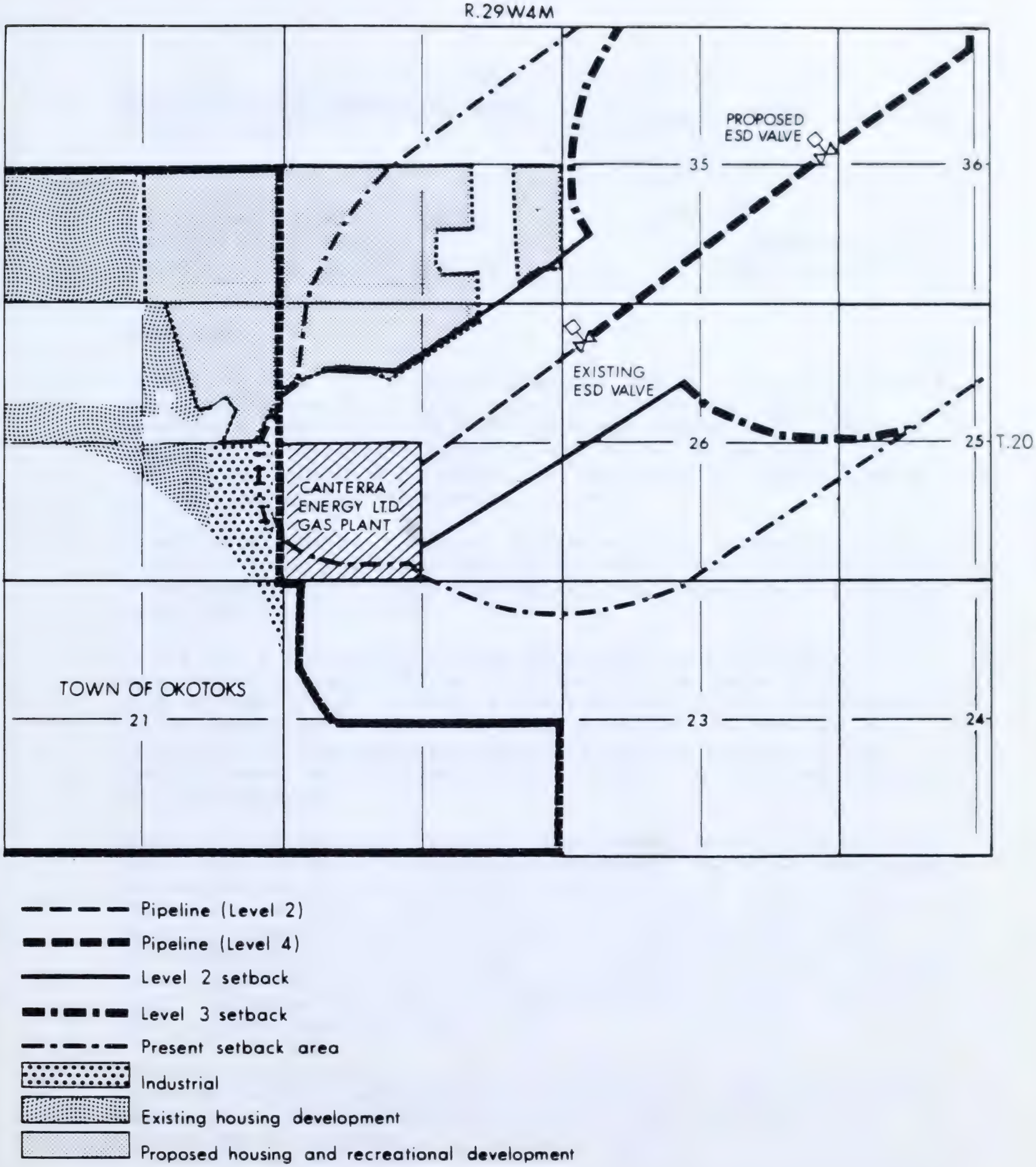
G.J. DeSorcy, P.Eng.
Board Member

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

VE Bohme

V. E. Bohme, P.Eng.
Board Member



TOWN OF OKOTOKS
PROPOSED EMERGENCY SHUTDOWN VALVE (ESD)

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

UNIVERSITY OF ALBERTA
OCT 30 1986

CHEVRON CANADA RESOURCES LIMITED
INCREASED ETHANE RECOVERY
KAYBOB SOUTH GAS PROCESSING PLANT

Decision D 86-16
Application 860159

## BACKGROUND

In February 1982, Chevron Canada Resources Limited (Chevron) submitted a Part I application for approval to extract ethane-plus ($C_2$+) from natural gas processed at its Kaybob South gas cycling plant located in section 15 of township 59, range 18, west of the 5th meridian. The application, along with two others, was considered at a public hearing in June 1982, and was subsequently approved.

After construction was completed, Chevron submitted Application 860159 to the Board for approval to operate the ethane extraction facilities at a considerably higher ethane recovery efficiency than first contemplated in the Part I application.

In its Part I application, all the gas exiting the sweetening and dewpoint control portion of the plant was to be processed in the turbo-expander plant. However, a number of the plant partners elected not to participate in the ethane recovery project. As a result, the feed to the turbo-expander was reduced to about 65 per cent of the Part I volumes, with the remaining 35 per cent to be by-passed around the turbo-expander.

Chevron now proposes an increased ethane recovery factor of 96 per cent, rather than the 80 per cent previously approved. The 20 per cent larger recovery factor (96 rather than 80), coupled with the 35 per cent decrease in the turbo-expander throughput, means that less total ethane would be removed at the plant than would have been the case under a Part I scenario, ie, full throughput and 80 per cent recovery. However, having regard for only the Chevron portion of the throughput (the 65 per cent), the higher recovery factor would increase the ethane removal by some 450 cubic metres per day.

Based on the information supplied by the applicant, the Board, by letter dated 10 June 1985, indicated that it was prepared to approve the application. Copies of the Board's letter of approval were sent to Chevron and the interveners to the Part I application.

Subsequently, the Board was made aware of additional details affecting the application and decided to reconsider its decision. Following notice of the application, a number of companies filed objections to the application, and the Board scheduled a meeting for 14 August 1986 to determine if a hearing was necessary. The table below lists those who appeared at the 14 August 1986 meeting.

THOSE WHO APPEARED AT THE MEETING

Principals and Representatives
(Abbreviations Used in Report)

Chevron Canada Resources Limited (Chevron)
  J. Stein

Dome Petroleum Limited
and
Dow Chemical Canada Inc.,
Union Carbide Ethylene Oxide/Glycol Company,
C-I-L Inc.,
Celanese Canada Inc., and
Novacor Chemicals Ltd.
  R. A. Neufeld

Amoco Canada Petroleum Company Limited
  L. Scheible

Alberta Gas Ethylene Company Ltd.
  H. D. Williamson

Alberta Natural Gas Company Ltd.
  J. R. Smith

Energy Resources Conservation Board staff
  M. J. Bruni
  E. P. Moeller, R.E.T.
  L. S. Fillion, C.E.T.

In a "Memorandum of Decision" dated 25 August 1986, the Board indicated that it was not prepared to grant Chevron's request to reinstate the approval indicated in the Board's letter of 10 June 1985, would not call a hearing, believed it had sufficient information to consider the application without requesting any further detail, and would issue its decision on the application at a later date.

## ISSUES

As indicated in its "Memorandum of Decision", the Board now views Chevron's application as one to recover incremental ethane at its Kaybob South plant over and above that which was approved in its Part I application. In considering the public interest aspects of that application and other similar ones involving the field extraction of ethane, the Board identified the following issues:

- the degree to which the proposed facilities would recover ethane and other natural gas liquids incremental to those volumes that would be recovered without the facilities,
- the present and future markets for the ethane and other natural gas liquids to be recovered at the proposed facilities,
- the cost of the products to be recovered at the proposed facilities compared to the cost of recovering similar volumes of the same products elsewhere in the province,
- the potential impact of the proposed facilities on the existing straddle plant system and on the Alberta petrochemical industry, and in particular the impact on the total cost of ethane to the industry,
- the impact of the proposed facilities on the potential for enhanced recovery of oil,
- the economic benefits to Alberta, including the public treasury, resulting from the incremental recovery of ethane and other natural gas liquids,
- the proprietary rights of gas producers,
- the degree of upgrading of resources within Alberta, and
- the conservation and environmental aspects of the proposed facilities.

The Board believes that these issues remain relevant when considering applications for field extraction of ethane; however, in this particular case, a detailed economic analysis is neither possible nor justified, having regard for the available information, the volume of ethane in question, and the present uncertainties in gas pricing and marketing. Therefore, in this instance, the Board intends to address the issues generally and qualitatively.

## VIEWS OF THE BOARD

By increasing the recovery factor from the approved 80 per cent to the proposed 96 per cent, Chevron would recover an additional 450 cubic metres per day more ethane from its portion of the gas than would have occurred under the original approval. Since the majority of the residue gas from the Kaybob South plant is currently injected in a gas cycling scheme, ethane not removed in the turbo-expander would be injected into the reservoir and a portion of it would be unrecoverable even after blowdown commences, sometime in the early 1990s.

Although a detailed volumetric calculation has not been made, a significant portion of the additional ethane proposed for removal at the plant would be incremental to those volumes that would otherwise be recoverable. The recovery of these additional volumes would be in the Alberta public interest, provided there is a market for them. The Board has not reviewed the overall supply/demand balance but notes that Chevron has a firm market for the ethane in question.

In terms of the costs of the additional ethane to be recovered at the Chevron plant, the Board has made no detailed calculations. However, since the incremental volume would be recovered from facilities which have been installed to recover the originally approved volumes, the Board expects the incremental cost would be very low. This additional low-cost ethane in the Kaybob area would likely have some beneficial impact in terms of the potential for enhanced oil recovery operations.

With respect to the impact of the incremental recovery on the existing straddle plant system and petrochemical industry, the Board believes it would be very small. This would be due in part to the small incremental volumes in question but also because for the initial 4 or 5 years, the residue gas stream would be cycled. This means there would be no potential negative impact for several years. (It should be noted that with the present-worth type of economic analysis used by the Board in processing the original application, these years would be of greatest significance in the calculation.)

The Board has not calculated the economic benefits to Alberta of the Chevron application to recover additional volumes of ethane. Based on a review of its calculation for the original application, and having in mind that the ethane would be recovered with no additional capital investment and that some of it would otherwise never be recovered because of the cycling project, the Board is satisfied there would likely be a small economic benefit to the province.

The Board is satisfied that the approval of the application would be consistent with the proprietory rights of producers, and would also upgrade some resources in the province that would otherwise not be recovered. The application is also satisfactory from a conservation and environmental viewpoint.

## CONCLUSIONS

The Board, although it has not quantified its conclusions, is satisfied that the benefits that would accrue from the increased recovery of ethane during the period of cycling would outweigh any potential negative impacts on the straddle plant system and the petrochemical industry. It is also satisfied with all other aspects of the application.

The Board believes that one additional comment is appropriate in these circumstances. The need to consider the Part II application as a request to recover incremental volumes of ethane resulted in part from Chevron's projecting a conservative recovery factor of 80 per cent at the time of the original hearing, and then determining that the facilities could do much better. The Board is aware that a similar problem has occurred in at least one other case. Although it continues to be hopeful that negotiations between producers and the straddle/petrochemical operators will reduce the need for the Board to arbitrate such matters in future, it believes that applicants for field deep-cut facilities should be applying for them on the basis of the highest recovery level which can reasonably be expected, rather than a conservatively estimated level.

## DECISION

Having regard for its views expressed earlier in this report, the Board is prepared to approve Chevron's Application 860159. The approval would be subject to the approval of the Minister of the Environment respecting environmental matters, and to the normal terms and conditions of gas processing plant approvals.

DATED at Calgary, Alberta, on 3 September 1986.

ENERGY RESOURCES CONSERVATION BOARD

GJDeSorcy

G. J. DeSorcy, P.Eng.
Vice Chairman

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

F. J. Mink, P.Eng.
Acting Board Member

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

NORTHWESTERN UTILITIES LIMITED
APPLICATION FOR A WELL LICENCE
HERCULES FIELD

Decision D 86-17
Application 860850

## 1 INTRODUCTION

### 1.1 The Application and Interventions

Northwestern Utilities Limited (NUL) applied pursuant to section 2.020 of the Oil and Gas Conservation Regulations for a well licence to drill a well in legal subdivision 6 of section 34, township 51, range 23, west of the 4th meridian, to be known as NUL HERCULES 6-34-51-23 (the proposed well). The purpose of the well would be to obtain gas production from the Basal Quartz Formation (Basal Quartz), and would replace a well at the same location which produced for a period from the Bazal Quartz and was abandoned due to formation damage.

An intervention opposing the application was filed by Alaskan Holdings Ltd. (Alaskan), the surface owner of the southwest quarter of section 34 (SW 1/4 Sec 34).

### 1.2 The Hearing

A public hearing of the application was held in Edmonton, Alberta, at the Mayfield Inn, on 15 September 1986, before Board Member C. J. Goodman, P.Eng., and Acting Board Members G. A. Warne, P.Eng., and E. G. Fox, P.Eng.

THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Northwestern Utilities Limited (NUL)<br>B. K. O'Ferrall | A. F. Boogman, P.Eng.<br>D. G. Fawcett<br>D. Stannard, P.Eng. |
| Alaskan Holdings Ltd. (Alaskan)<br>D. J. Buchanan, Q.C. | J. Scheckter |
| Energy Resources Conservation Board staff<br>A. A. Gervais<br>N. F. Lord<br>L. A. Whittaker<br>C. S. Richardson | |

## 2 THE ISSUES

The Board considers the issues with respect to the application to be

o the need for the well,
o the location of the well, and
o the impact of the well.

## 3 VIEWS OF NUL

NUL submitted that as lessor of freehold and Crown leases and by virtue of a farm-in agreement, it had the right to explore for and produce the gas reserves which underlie section 34, township 51, range 23, west of the 4th meridian.

NUL submitted that there was a need for the well since it had a market for any gas reserves captured and that the required processing of the gas could occur at an existing gas processing facility at the proposed well site.

NUL requested that the Board render a timely and expedient decision in this matter as the drilling of the proposed well was contingent on meeting time commitments for both freehold and Crown leases. Further, the applicant wished to take advantage of a government drilling incentive program scheduled to terminate at the end of September 1986. NUL also stated that it was the holder of a surface lease on the SW 1/4 Sec 34 on which it had operated a well until recently and had right of entry to drill the subject well. NUL provided a copy of the surface lease as part of its application.

NUL submitted that the proposed well's location was based on its geologic interpretation which indicated a structural high in the SW 1/4 Sec 34. The applicant expects to encounter 4.3 metres (m) to 4.6 m of gas pay and a related 84 million cubic metres ($10^6$ m3) to 112 x $10^6$ $m^3$ of recoverable gas reserves. The Basal Quartz in the area of application is the equivalent of the Board-defined Hercules Ellerslie C Pool. Based on its geologic interpretation, NUL submitted that the location of the well was critical and any movement in the location could result in an increase in the risk of not obtaining an economically viable well.

NUL had investigated the possibility of locating the well as requested by Alaskan, in the northeast quadrant of Lsd 6; however, it stated that due to the geologic structure of the Basal Quartz, this was not a viable alternative. NUL's interpretation indicated that the Basal Quartz structure dropped off in a northeasterly direction. NUL submitted that if the well location was moved to the northeast it would require completing it closer to the gas water contact associated with the structure. NUL estimated that at the northeast corner location there could be a reduction of approximately 1.2 m to 1.5 m of gas pay and an associated loss of approximately 56 x $10^6$ $m^3$ of recoverable gas reserves.

NUL had investigated the possibility of directionally drilling the proposed well from the location suggested by Alaskan; however, it submitted that this alternative was not attractive due to the additional costs. Moreover, NUL submitted that additional operating and maintenance costs could arise in the future and there was a greater likelihood of mechanical difficulties with the production of a directionally drilled well as compared to a conventionally drilled well.

Respecting the impact of the proposed well, NUL submitted that it could not see any additional impact resulting from the drilling of the well as the location it proposed was on a currently existing well site with gas processing facilities in place on the well site. It added that it was of the opinion that the requested alternative may have a greater impact because an additional lease would be required.

NUL did state that at such time as Alaskan proceeded with its development plans, NUL would be prepared to co-operate and discuss measures to help reduce any adverse impact its facilities may impose.

## 4 VIEWS OF ALASKAN

Alaskan submitted that it had not reviewed any leases or agreements NUL may hold respecting the mineral rights to the drilling spacing unit; therefore it could not comment on NUL's right to drill the proposed well and recover any associated gas reserves.

Alaskan also stated that it had not had any geologic interpretation done on the area of application and had no comments with respect to NUL's geologic prognosis.

Alaskan did question the validity of NUL's surface lease in the subject quarter section and therefore its right to drill a well on the existing well site under the terms of the lease.

Alaskan submitted that it had concerns with respect to the proposed well location and requested that the well be located in the northeast quadrant of Lsd 6. Alaskan submitted that the location proposed by NUL would adversely impact its development plans for the quarter section. Alaskan submitted that it intends to build a mini-warehouse facility on the quarter section and that the proposed well would adversely impact both the exposure of the facility from Highway No. 14 located to the north of the well and development of the proposed warehouse facility. Alaskan submitted that its requested location would situate the well in a low area and not interfere with the exposure of its proposed development to the degree which would result from the site proposed by NUL. It was Alaskan's preference, however, that the well not be drilled at all and also that the existing gas processing facilities be relocated to the northeast quadrant of Lsd 6 or completely removed from the quarter section.

## 5 VIEWS OF THE BOARD

The Board is satisfied that the applicant, by virtue of its mineral leases, has the right to explore for reserves in the subject drilling spacing unit. The Board is also satisfied that there are reserves underlying section 34 and there is a need for the proposed well to recover them.

With respect to the validity of the surface lease on the subject quarter section referred to by NUL, the Board believes that the matter is outside its jurisdiction and not one which it should comment on or consider in this proceeding.

The Board has reviewed the geologic interpretation submitted by NUL and finds it reasonable. The Board therefore accepts NUL's submission with respect to locating the well geologically as applied for. The Board notes that no alternative interpretation was provided by the intervener.

With respect to directionally drilling the well, the Board accepts that this alternative is technically feasible; however, the additional costs and risks associated with this alternative make it unsuitable. In this case the additional costs and risks are not outweighed by any additional impact that would be created by the well.

With respect to the adverse impact of the proposed well, the Board believes that since it would be drilled on an existing well site on which gas processing facilities it would need are already located, the drilling of the proposed well would have little if any additional impact on the property. The Board notes that the development plans provided by Alaskan were not prepared to accommodate the existing facilities and therefore some modifications may be possible to allow for both developments to co-exist. The Board believes that Alaskan's proposed development is still in the planning stage and notes that the subject land would still require rezoning by the municipality and applications by Alaskan for development permits. The Board accepts NUL's undertaking to co-operate and discuss measures which may be implemented to reduce any negative impact of the existing well site and proposed well if Alaskan proceeds with the development.

## 6 DECISION

Having reviewed the evidence, the Board is satisfied that the drilling of the well would not result in significant additional impacts on the area of application and therefore the subject application is approved. A licence to drill the well will be issued in due course.

DATED at Calgary, Alberta, on 24 September 1986.

ENERGY RESOURCES CONSERVATION BOARD

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

G. A. Warne

G. A. Warne, P.Eng.
Acting Board Member

E. G. Fox

E. G. Fox, P.Eng.
Acting Board Member

**ENERGY RESOURCES CONSERVATION BOARD**

Calgary Alberta

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# FORDING COAL LIMITED APPLICATION FOR APPROVAL OF CASSILS RAILWAY SIDING FOR SHIPMENT OF BULK COAL SAMPLES

**Decision D 86-18**
**Application 860664**

## 1 INTRODUCTION

### 1.1 The Application

On 30 June 1986 Fording Coal Limited (Fording) applied to the Energy Resources Conservation Board (Board) for a public hearing to decide on the use of Cassils railway siding for shipment of bulk samples of raw coal to potential customers for test purposes.

### 1.2 The Hearing

A public hearing of the application was held on 26 August 1986 in Brooks, Alberta, with N. A. Strom, P.Eng. (Chairman), L. A. Bellows, P.Eng., and R. G. Evans, P.Eng., sitting. During the hearing the Board panel, accompanied by the applicant, the interveners, and the Board staff, visited the proposed load-out site at Cassils and a possible alternative site at Brooks, recommended by the interveners.

A list of those who appeared at the hearing is given in the following table.

## 2 BACKGROUND AND APPLICATION

In May 1986 Fording applied to the Board for a permit to excavate bulk coal samples, for test purposes, totalling 30 000 tonnes of raw coal in the Bow City area of the Brooks coal field.

Fording planned to transport coal by truck approximately 30 kilometres to an existing railway siding at Cassils. Bulk coal shipments each amounting to 3000 to 4000 tonnes would be transported by rail to the Great Lakes marketing area or to Roberts Bank for ocean shipment. The hamlet of Cassils is located on the Canadian Pacific Railway transcontinental line, some 8 kilometres west of the town of Brooks.

Bulk coal samples would be required by potential customers for burn testing. When adequate market acceptability is established, the feasibility of a full-scale mining operation would be pursued.

Pursuant to the Coal Conservation Act, Fording was granted Permit No. C 86-3 by the Board on 12 June 1986, allowing Fording to excavate up to 30 000 tonnes of raw coal in the Bow City area for test purposes. A clause in the permit required that, prior to transporting any bulk coal sample, the Permittee would have to submit to the Board for its approval

a) a detailed coal transportation, stockpiling, and loading plan, and

b) evidence to satisfy the Board that such plan would not create problems with respect to dust and spontaneous combustion.

On 30 June 1986 Fording submitted a coal transportation, stockpiling, and loading plan in response to the above noted requirements. Fording at the same time requested that the Board call a public hearing to consider its transportation plans and to hear repre-

**THOSE WHO APPEARED AT THE HEARING**

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Fording Coal Limited (Fording)<br>D. A. Holgate | J. G. Gardiner, P.Eng.<br>D. J. Shyluk, P.Eng.<br>J. Fulford |
| R. C. Scott and Cassils Community Group (the interveners)<br>R. G. Riggins | R. C. Scott, P.Eng.<br>R. E. Perini<br>D. A. Dick |
| Energy Resources Conservation Board staff<br>H. R. Hansford<br>R. G. Paterson, P.Eng.<br>K. Jamil, P.Eng.<br>E. S. Mahadeo, P.Eng. | |

sentations respecting unresolved concerns expressed by the Cassils residents about the suitability of the proposed Cassils rail load-out.

The following is a summary of the proposed coal transportation, stockpiling, and loading plan:

- To minimize the possibility of any spontaneous combustion of coal within the stockpile at the test pit, the crushed coal would be placed in lifts and compacted.
- Coal would be hauled periodically from the stockpile at the Bow City test pit whenever test shipments were scheduled.
- Dump trucks of 20-tonne capacity would travel a designated route along a County of Newell gravel road east to paved roadways, Secondary Road 539, and Highway 36, to the Cassils turnoff.
- The existing gravel roadway to Cassils would be used for access to the loading area.
- At Cassils, a new roadway and loading pad would be constructed on Canadian Pacific Railway land adjacent to an existing rail siding and parallel to the main transcontinental rail line.
- Up to forty 100-tonne rail cars (adequate to accommodate each 3000- to 4000-tonne test sample shipment) would be spotted on the siding when a test shipment is scheduled.
- Coal haul-trucks would dump their loads onto the load-out pad and then the coal would be loaded onto the rail cars with a front-end loader. A coal stockpile of 20 to 60 tonnes would be needed at the load-out pad to balance trucking and rail-loading sequences.

## 3 POSITIONS OF THE PARTIES

### 3.1 Fording

Fording expressed the need for a railway siding and load-out pad in order to allow shipments of bulk coal samples to potential customers so that an evaluation of the development of its coal resources in the Bow City area could be made. Fording claimed that the Cassils siding was the most convenient load-out site, had the lowest operational cost, and was technically the most efficient. If this siding were to be approved for shipment of test samples, Fording would monitor possible impacts of the operation on residents of Cassils and if there were problems with dust, excessive noise, or traffic safety, mitigative measures would be taken. Fording would also monitor activities to establish enough site-specific data on the coal-loading operations so that both the residents of Cassils and Fording would at some future time be in a better position to evaluate the feasibility and impacts if the load-out was being considered for use for a commercial mine of 300 000 tonnes per year or more.

### 3.2 The Interveners

The interveners expressed concerns with Fording's use of the Cassils railway siding to load-out bulk coal test samples. The interveners' concerns pertained to road safety and increased dust and noise pollution. They expressed the view that the operation would impact significantly on their country life-style and that problems associated with the use of Cassils siding could be avoided if Fording used an alternative railway siding and potential load-out site in the industrial area at the town of Brooks.

## 4 ISSUES

The issues for consideration are

- the need for a railway load-out facility to ship bulk coal samples,
- technical and economic suitability of the Cassils siding,
- the environmental impacts on Cassils residents,
- safety concerns with increased heavy traffic on the Cassils road.

## 5 NEED FOR A RAILWAY LOAD-OUT FACILITY TO SHIP BULK COAL SAMPLES

Fording stated that Permit No. C 86-3 allowed it to excavate bulk coal samples for test purposes at the Bow City test pit. In order to investigate the economic viability of a future coal-mining operation at Bow City, Fording needed a railway load-out facility to ship bulk coal samples to potential customers for testing. It was necessary for bulk samples to be tested for burn characteristics and coal quality. Assessment of the economic viability of a full-scale mine therefore depended on shipment of these bulk samples.

The interveners did not contest Fording's need for a load-out facility. However, they were concerned that allowing shipment of test coal samples at the Cassils siding now would be seen as their acceptance of the first step toward commercial usage. This could then prejudice their ability to oppose future use of Cassils siding as the load-out site for a commercial coal-mining operation.

The Board agrees that a rail load-out facility would be needed even if it only involved the relatively small test sample quantities of 3000 to 4000 tonnes per shipment. Information obtained during test shipment operations might aid in better defining potential environmental impacts at Cassils should a commercial-scale operation be proposed in the future. Fording indicated through evidence and in its closing statement that it is looking ahead to such a possibility. In this perspective, the Board can well appreciate the concerns expressed by the interveners. However, the Board wishes to stress that it is clearly not dealing with a commercial-scale application at this time. Therefore, it would not view any approval it might issue for test sample shipments as being a first stage of commercial-scale operations. On the contrary, if and when Fording makes application for a commercial mine operation and load-out facility, the Board would expect Fording to provide detailed technical, environmental, social, and economic studies which would include investigations of alternative commercial load-out options.

## 6 TECHNICAL AND ECONOMIC SUITABILITY OF THE CASSILS SIDING

Fording said that in considering the use of Cassils railway siding it looked at alternative sites, including the siding at Brooks industrial park.

Fording submitted that the proposed Cassils load-out site was favourably located and would have an operational cost $2.00 to $2.25 per tonne lower than the Brooks alternative. Also, Cassils had the required rail siding capacity to assemble a full test sample shipment of up to 40 rail cars whereas the Brooks siding could only permit assembly of 20 to 24 rail cars, which is half the size of a test sample. An added significant advantage at Cassils was that rail-car shunting would be performed exclusively by Fording whereas the Brooks siding would require Canadian Pacific Railway to perform shunting and rail-car assembly.

The interveners expressed concerns with the logistics of using Cassils siding. They suggested that the Board should require Fording to submit a detailed plan showing the available siding trackage and describing the manner in which rail cars would be marshalled.

The Board concludes, from evidence before it, that the Cassils siding is technically acceptable for shipment of coal test samples, and accepts Fording's evidence that rail-car assembly could be achieved without entering onto the main passing line. This latter aspect is a key advantage of the Cassils siding over that at the Brooks industrial park.

## 7 ENVIRONMENTAL IMPACTS ON CASSILS RESIDENTS

Fording indicated that a typical test shipment of 3000 to 4000 tonnes would involve trucking of some 1000 tonnes per day over a 3- to 4-day period. The total of 30 000 tonnes would therefore be moved in eight to ten shipping periods over the next 12 months.

Fording submitted that the Bow City coal is relatively hard and is not susceptible to dusting. Therefore, coal handling acitivty at the proposed Cassils load-out pad should not create a coal dust problem. Fording stated that dust generated by road traffic during coal hauling operations could be readily suppressed by sprayings of calcium chloride solution or water. Additionally, Fording said that it intended to restrict hauling and loading activities to daylight hours between 8:00 a.m. and 6:00 p.m. to avoid possible noise impacts on the Cassils community.

In accordance with its environmental plan, Fording said it intended to monitor dust and noise associated with coal transportation and load-out activities. Fording gave the assurance it would receive and act upon any noise or dust complaints from the Cassils community, including shutting down operations if serious problems occurred.

The interveners stated that coal dust and road dust generated during load-out operations would present serious problems to Cassils residents. They expressed concerns that the commitment to mitigate dust problems would be at Fording's discretion and the situation could get out of control before action was taken by the company.

The interveners said that traffic and load-out operations would create serious noise problems. They believed the company could use computer simulation techniques to pre-determine the level of noise that could be generated.

The Board accepts Fording's commitment to conduct a thorough dust monitoring program and a noise impact assessment and to take corrective action whenever necessary to eliminate any adverse impacts on the residents of Cassils. If approval is granted, the Board would require that monitoring first be done to establish base conditions and then during peak activity periods to establish the impact of the coal-loading operation on the Cassils residents. The Board would also require that Fording provide the names and contact telephone numbers of its supervisors to the Cassils community so that prompt action on residents' complaints would be ensured.

The Board notes that the loading operations will typically take place over 3 to 4 days and therefore does not accept that monthly monitoring of dust at the rail siding as proposed by Fording would be representative of the potential dust impact. The Board would require Fording to utilize a system of dust monitoring capable of measuring dust released during the shipment load-out interval such that it can be compared with non-loading intervals.

## 8 SAFETY CONCERNS WITH INCREASED HEAVY TRAFFIC ON THE CASSILS ROAD

Fording submitted data to show that heavy truck traffic on the Cassils road would increase from a current daily average of 56 vehicles to a daily average of 196 vehicles during coal loading operations.

Fording expected that its coal transportation and railway load-out contractor would operate all trucks and equipment within provincial and county traffic laws and regulations. In addition, Fording made the commitment to include conditions in the contract to ensure operations were conducted in a safe and efficient manner. All transportation and loading activities associated with shipment of coal samples would be performed under Fording supervision and the Fording supervisors would be authorized to take any necessary mitigative or disciplinary actions.

The interveners were concerned that the larger coal-hauling trucks might create a traffic hazard by forcing smaller vehicles off the Cassils road and onto the soft shoulders. They submitted that the increased freqency of heavy trucks on the Cassils gravel road would have a serious impact on the school bus, on children waiting along the road for the school bus, on the 4-H Club activity with 20 to 25 children riding horses and bikes on the road, and on people who use the road to herd cattle and horses. The interveners were also concerned with the visibility on the main Canadian Pacific Railway lines at the railway crossing. They submitted that, with the crossing located very close to the end of the siding, and when the siding was filled with 40 rail cars, drivers would be unable to see trains approaching the crossing from the west.

The Board fully recognizes the kinds of concerns expressed by the interveners respecting traffic safety. Those that pertain to use of the Cassils road should be manageable through normal highway safe driving and common courtesy. The matter of crossing the main rail line is potentially more difficult and may require control by a flagman who has full view of all approaching rail and road traffic. The Board therefore concludes that if the Cassils site were approved, the Board would require Fording to submit a code of practice, acceptable to the Board, to ensure safe driving and safe entry and egress from the proposed Cassils load-out site.

## 9 DECISION

The Energy Resources Conservation Board hereby approves the application by Fording Coal Limited for use of the Cassils railway siding and for the construction and use of a coal load-out pad at this siding to facilitate shipment of a cumulative total of 30 000 tonnes of bulk coal samples, typically sized at 3000 to 4000 tonnes per shipment provided that Fording Coal Limited shall

1) provide effective supervision of coal-hauling and load-out operations during coal sample shipments. The names, contact telephone numbers, and responsibilities of the supervisors shall be submitted to the Board and to Mr. R. C. Scott and the Cassils Community Group prior to commencement of coal-hauling operations;
2) submit a code of practice, acceptable to the Board, for trucking on the Cassils gravel road and for safe entry and egress from the coal load-out pad, prior to transportation of any bulk coal sample;
3) implement dust-suppression measures along the Cassils gravel road and at the coal load-out pad whenever necessary during coal shipment operations;
4) establish a dust-monitoring program capable of measuring dust released during coal shipment and non-shipment intervals at the Cassils railway siding;
5) conduct a noise survey in the load-out area prior to commencement of any activity and during the first coal shipment operation;
6) submit a report to the Board after shipment of the first bulk sample, and as required by the Board thereafter. This report should include all monitoring data acquired, an interpretation of the data, reference to any complaints received, and discussion on the nature and method of resolution of any problems experienced.

DATED at Calgary, Alberta, on 28 October 1986.

ENERGY RESOURCES CONSERVATION BOARD

N. A. Strom, P.Eng.
Board Member

L. A. Bellows, P.Eng.
Board Member

R. G. Evans, P.Eng.
Acting Board Member

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ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

# REPORT TO THE MINISTER OF ENERGY ON THE REVIEW OF CERTAIN GAS REMOVAL PERMITS ISSUED 3 JANUARY 1986

ERCB Report 86-B
Proceeding 860447

## 1 INTRODUCTION

On 19 December 1985, the Government of Alberta authorized the Energy Resources Conservation Board to issue seven long-term gas removal permits which had been recommended to the Lieutenant Governor in Council in February 1983 (ERCB Report D 83-B). Coincident with authorization to issue the permits, the then Minister of Energy, in a letter to the Chairman of the ERCB, asked that the Board review each of the resulting permits "...to ensure that the gas permitted to be removed is likely to be delivered to the markets identified in the original application". The reviews, undertaken in light of changes in the marketing situation for Alberta gas during the four years since the applications were filed, were particularly intended to "...ensure that potential sales of Alberta gas will not be denied because of insufficient gas when these permits are not being fully utilized".

The seven permits reviewed are listed in the attached table. Two are new permits and five are revisions and consolidations of previous permits. With regard to the five "revised and consolidated" permits, only the volumes added to their existing volumes on 3 January 1986 were subject to the review.

The Board used an informal process in conducting its review of the seven permits. Letters were sent to the permittees informing them of a meeting to be held in the Board offices on 20 January 1986, to discuss the kinds of information the Board identified as being necessary to complete the review. All five companies holding the permits were represented at the meeting and agreed to the basic data requirements of the Board. Information on reserves, markets, transportation, and expected deliveries was submitted during the months of March and April 1986. The submissions are available to interested persons at the Board's Records Centre, Main Floor Energy Resources Building, 640 - 5 Avenue S.W., Calgary, Alberta, T2P 3G4.

## 2 ISSUES

The Board believes there are three issues of primary importance in performing the permit reviews. The first two deal with "markets", the third relates to "reserves". The issues are:

- identification of market areas to be served,
- general suitability of the intended markets, including their adequacy to absorb the permitted volumes and facility capabilities, and
- availability of gas reserves to support the authorized removal volumes.

## 3 MARKETS

### 3.1 Summary of Submissions

TransCanada PipeLines Limited (TCPL), through its subsidiary Western Gas Marketing Ltd., indicated that about one-half of its general system supply is likely to be sold in domestic markets east of Alberta. TCPL's remaining supply is intended for the export market, most of which has received the necessary export/import authorizations. TCPL is pursuing sales agreements in the U.S. spot market as well as long-term contracts with other U.S. purchasers. TCPL identified the uncertainty surrounding access to U.S. pipelines as a major factor in determining the nature of future contracts.

Alberta & Southern Gas Co. Ltd. (A&S) stated that its single most important market is in California, via Pacific Gas and Electric Company, under a contract dating back to 1961. It was submitted that this arrangement could continue well beyond the expiry dates of existing contracts and regulatory permits.

Under Permit PA 85-1, Pan-Alberta Gas Ltd. (Pan-Alberta) sells gas in the domestic market to Gaz Metropolitain, inc. and to TCPL. Its most important customer, however, is Westcoast Transmission Company Limited which exports to the northwestern U.S. Under Permit PA 85-2, Pan-Alberta moves gas through the eastern and western legs of the Prebuild Pipeline for ultimate distribution in a number of states from California to Ohio.

ProGas Limited (ProGas), under Permit PG 85-1, sells gas to four U.S. pipeline companies: ANR Pipeline Company, Natural Gas Pipeline Company of America, Tennessee Gas Pipeline Company, and Texas Eastern Transmission Corporation. As with TCPL and Pan-Alberta, the ultimate markets cover a wide geographic area, principally in the Michigan/Wisconsin region of the U.S. Under the terms of its other permit, PG 85-2, ProGas would sell in the same market area with additional volumes to be sold in the northeastern U.S. For the volumes intended for the northeast, new facilities would have to be constructed at Niagara.

The KannGaz Producers Ltd. (KannGaz) permit, KG 85-1, was initially scheduled to begin sales in 1984, however, events have developed which will delay start-up until at least November 1987. The principal reasons for the delay relate to facilities construction in both Canada and the U.S. Although KannGaz remains hopeful of having the necessary facilities installed to access the northeastern U.S. market, interim short-term sales agreements are being pursued.

### 3.2 Views of the Board

The Board appreciates that the North American gas market is in an unprecedented state of flux. Consequently, and with some exceptions, it is difficult to know whether existing contracts will necessarily apply throughout the terms of the permits under consideration. As well, the Board notes from the submissions a number of preconditions which must be met before agreements in principle can become effective. The most important of these seem to be the construction of new facilities at Niagara (with possible expansion of existing facilities) and resolution of U.S. pipeline regulations.

Notwithstanding the uncertainty regarding the above issues, the Board notes that the permittees' intended market areas have been purchasing gas from Alberta for a number of years, and only in the northeastern U.S. does the market represent a significant expansion over existing deliveries of Alberta gas. The Board expects these will continue to be suitable markets in the future. Regardless of how U.S. pipeline regulatory matters are resolved, it seems to the Board that the same ultimate customers would generally require the same volumes of gas. While the gas may come to be sold under a different set of contracts than is the case currently, there is no reason to expect significant changes in volumes required. With respect to the northeastern U.S. the Board is aware of the potential for new markets, pending the outcome of deliberations regarding new facilities.

The Board also notes that as of January 1986, it was technically possible for all of the permittees to deliver the total volume of gas under permit, within the permit terms and maximum annual provisions. Also, there is no evidence to suggest that these permits have "monopolized" volumes of gas that could be better used by others, whether by way of applications which could not be approved due to a lack of surplus gas, or as a result of evidence contained in submissions to this proceeding.

## 4 AVAILABILITY OF RESERVES

Submissions to the present review all contain information and assurances on the availability of reserves under contract to supply the authorized removal volumes. Pan-Alberta, ProGas, and TCPL all indicate volumes of remaining gas under contract in excess of the remaining authorized volumes in their permits. A&S and KannGaz show deficiencies in supply of some 10 and 4 per cent respectively since making their original applications. Both companies state that additional new supplies are either being contracted or will be contracted to serve their market requirements.

The Board has recently completed its annual assessment of reserves under contract to major permit holders. Results of the study show that for all permits subject to the present review, including the A&S and KannGaz permits, reserves under contract at year-end 1985 were greater than the remaining permit volumes including the new volumes approved on 3 January 1986. For this reason, and having dealt rigorously with reserves in the original applications, the Board is confident that sufficient reserves will be available to supply the remaining volumes in each of the permits. The table attached to this report shows, together with other pertinent data, the Board's latest estimates of reserves under contract for each of the permits being reviewed.

## 5 FINDINGS AND RECOMMENDATIONS

Having considered the evidence submitted by Alberta & Southern Gas Co. Ltd., KannGaz Producers Ltd., Pan-Alberta Gas Ltd., ProGas Limited, and TransCanada PipeLines Limited regarding markets and reserves for gas authorized for removal under permits AS 85-1, KG 85-1, PA 85-1, PA 85-2, PG 85-1, PG 85-2, and TC 85-1, and having regard also for its own knowledge and experience, the Board concludes as follows:

o The intended market areas generally are and will likely continue to be served by Alberta gas.

o The permittees are in competitive supply positions and are likely to effect significant sales of gas during the terms of their permits.

o Potential exists for the expansion of Alberta's gas markets pending clarification of regulatory and supply uncertainties and installation of additional transportation facilities.

o Reserves and contracted volumes remain adequate to supply the volumes authorized for removal.

The first three of these conclusions are very much clouded as to details because of the great uncertainties that exist. Notwithstanding these uncertainties, the Board does not see a need, nor a real basis, at this time, for reducing the volumes in the permits under consideration. It is the Board's opinion that any such changes would be arbitrary and probably unproductive. This is particularly the case given that applicants for permits are not having to be refused due to lack of available gas.

The Board therefore recommends that the permits not be amended to reduce their authorized removal volumes. However, the Board would plan to monitor the permits regularly and, if the permits are not being adequately utilized, to subject them to another review. Hopefully, the previously referred to uncertainties will diminish in the coming year or so, and this would have the potential to make a review more meaningful.

DATED at Calgary, Alberta, on 2 October 1986.

ENERGY RESOURCES CONSERVATION BOARD

GJDeSorcy

G. J. DeSorcy
Vice Chairman

## PERMITS SUBJECT TO 1986 REVIEW
(Volumes Expressed in $10^9$ $m^3$)

| Company | 1 Previous Permit No. | 2 Present Permit No. | 3 Initial Volume in Previous Permit | 4 Incremental Volume Included in Present Permit (3 January 1986) | 5 Total Initial Volume Included in Present Permit (3 January 1986) | 6 Production to Year-End 1985 | 7 Remaining under Permit 3 January 1986 (Incl. Vol. in Col. 4) | 8 Board Estimate of Reserves under Contract at Year-End 1985 |
|---|---|---|---|---|---|---|---|---|
| Alberta & Southern Gas Co. Ltd. | AS 80-7 | AS 85-1 | 317.1 | 47.1 | 364.2 | 210.3 | 153.9 | 155.4 |
| KannGaz Producers Ltd. | (New) | KG 85-1 | - | 14.8 | 14.8 | Nil | 14.8 | 15.3 |
| Pan-Alberta Gas Ltd. | PA 80-3 | PA 85-1 | 27.5 | 4.5 | 32.0 | 12.4 | 19.6 | 23.0 |
| Pan-Alberta Gas Ltd. | PA 81-4 | PA 85-2 | 138.0 | 23.3 | 161.3 | 16.0 | 145.3 | 150.1 |
| ProGas Limited | PG 79-1 | PG 85-1 | 34.0 | 9.3 | 43.3 | 6.3 | 37.0 | 44.0 |
| ProGas Limited | (New) | PG 85-2 | - | 37.3 | 37.3 | Nil | 37.3 | 46.0 |
| TransCanada PipeLines Limited | TC 79-12 | TC 85-1 | 834.0 | 302.4 | 1136.4 | 553.6 | 583.8 | 615.0 |

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

HIGH LEVEL ENERGY LTD.
APPLICATION FOR A WELL LICENCE
LEDUC-WOODBEND FIELD

Decision D 86-12
Application 860692

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## 1 INTRODUCTION

### 1.1 Application and Interventions

High Level Energy Ltd. (High Level) applied, pursuant to section 2.020 of the Oil and Gas Conservation Regulations (the Regulations), for a licence to drill a well, to be known as HIGH LEVEL ET AL LEDUC 8-13-51-26 (the proposed well), to obtain oil from the Basal Quartz Sandstone. The proposed well would be drilled in legal subdivision 8 of section 13, township 51, range 26, west of the 4th meridian, on a subdivision lot owned by Mr. James R. Mancini.

The attached figure (Attachment 1) is a map of the area showing the location of the proposed well, the limits of the city of Edmonton, residences and subdivided lots within a 500-metre (m) radius of the applied-for well, and features pertinent to the area and the subject application.

Written interventions opposing the application were filed by Dr. and Mrs. K. B. Wianko, the County of Parkland No. 31, Mr. Don Bogach, Mr. and Mrs. Walter and Stella Zoschke, and Mr. and Mrs. Alfred and Liselotte Schindler. In addition, at the commencement of the hearing, several landowners of the area came forward to request participation in the proceeding (see table).

A written submission was also filed by Mr. James R. Mancini, the surface owner of the subject land, in support of the application.

### 1.2 Hearing

A public hearing of the application was opened on 3 July 1986 at the Mayfield Inn in Edmonton, Alberta, before Board Members G. J. DeSorcy, P.Eng, C. J. Goodman, P.Eng., and Acting Board Member R. G. Paterson, P.Eng. (the Board). Prior to the presentation of evidence, a request for adjournment was made by the interveners on the grounds that sufficient notification of the hearing had not been given to all landowners and residents of the area who might have concerns respecting the application. High Level submitted that the request was not reasonable as sufficient notification of the hearing had been given.

After considering the notification procedures followed by Board staff, the Board believed that its legal obligation had been met. However, in this particular circumstance where persons outside an immediate notification area came forward believing they might be affected, the Board, wishing to be completely fair, granted the request for adjournment, published the notice of re-scheduling of hearing in the Edmonton papers, and made efforts to deliver a copy of that notice to all residents in the south halves of sections 13 and 18. The hearing was reconvened on 22 July 1986, at which time the application was considered.

## THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| High Level Energy Ltd. (High Level)<br>S. R. Miller | D. D. Copeland, P.Eng.<br>H. H. Higgins<br>D. M. Leahy, Ph.D.<br>E. M. Leslie<br>G. G. Moroz, P.Geol. |
| County of Parkland No. 31 (the County)<br>A. Acorn | C. R. Breckenridge<br>R. Pollock |
| Dr. and Mrs. K. B. Wianko (Dr. Wianko)<br>J. C. Prowse, Q.C. | K. B. Wianko, M.D. F.R.C. |
| D. Bogach | |
| Walter and Stella Zoschke | S. Zoschke |
| Alfred and Liselotte Schindler | A. Schindler |
| L. H. Bates | |
| R. J. Ostrowski | |
| J. S. Scaber | |
| Mrs. H. Lewicki | |
| F. Herzog | |
| Energy Resources Conservation Board staff<br>A. A. Gervais<br>M. E. Connelly<br>N. F. Lord, C.E.T.<br>D. K. Boyler | |

### 1.3 Deferral of the Application

In November 1986, prior to the Board rendering a decision with respect to this matter, High Level requested that the Board defer its consideration of the application until further notice. Upon receipt of this submission the Board considered the request, granted the deferment, and all parties were notified.

During January 1987 High Level advised the Board in writing that it wished to have the Board continue consideration of its application. Due to the length of the deferment period, the Board directed that all parties should be again notified and requested that High Level confirm in writing that all commitments and undertakings given at the hearing remain current and that High Level was in a position to satisfy and comply with all those commitments and undertakings. By way of a letter dated 3 February 1987, High Level stated that it "is in a position to satisfy, honour and fulfill all of the commitments and undertakings agreed upon at the public hearing". Submissions were received from some of the interveners, basically indicating that if the matter was to proceed they would request clarification as to the commitments and undertakings of High Level and that if the application was approved they would want input into any emergency response plan prepared for the drilling of the well. In addition, the County of Parkland No. 31 submitted that the Board should not assume that circumstances had remained static during the period of deferment. In particular, the County referred to the construction of a new residence in the south half of section 13, and to a new "Land Use By-Law" adopted in September 1986, which the County submitted was more restrictive than the by-law previously in place and which it requested the Board to take into consideration.

After consideration, the Board decided that it could continue with the application without advertising the application or re-opening the hearing, based on the following:

- the Board is satisfied that all efforts were made to ensure broad notice of the 22 July 1986 hearing and that all persons who registered as participants at the hearing have been provided with copies of the post-hearing correspondence received by the Energy Resources Conservation Board (ERCB);

- no specific request was received by the Board to re-advertise or re-open the hearing;

- the Board is satisfied that the concerns of the area residents were adequately identified at the hearing and the Board believes it is fully aware of the residents' position respecting the application; and

- High Level has confirmed that it will abide by all commitments and undertakings presented at the hearing and the Board would point out that these are now a matter of public record as set out in this report and the transcripts of the hearing.

## 1.4 Background

The proposed well would be located in the Leduc-Woodbend Field, a field defined by Board Order F 5107. Field production is typically from the Blairmore Group and Devonian System. Both of these oil bearing geologic features frequently contain small amounts of hydrogen sulphide gas ($H_2S$) associated with the oil.

The area of application is adjacent to the Edmonton city limits and approximately one township south of an area defined in ERCB Inquiry Report D 83-F, ERCB Inquiry, Resource/Development, West Edmonton Area, dated 8 July 1983. That inquiry was held for the purpose of reviewing plans for both energy resource and urban development in the West Edmonton area, and to establish guidelines which would permit the developments to co-exist.

Due to the proximity of the proposed well to local residences and the city of Edmonton, High Level, although not required by ERCB regulations, had established a planning radius of 500 m from well centre, for the purposes of notification of persons living and/or owning land in the area and also to define an area for implementation of an emergency response plan in case $H_2S$ was encountered. In July 1986, during the interim period between the adjournment and reconvening of the hearing, the applicant had held an "open house and information session" for local residents, to answer questions with respect to the proposed well.

The local residents and landowners who intervened opposing the drilling of the well expressed concerns over the potential for $H_2S$ emissions and the general degradation of their standard of living by the perceived adverse impacts of a hydrocarbon-producing installation. They further felt that such an installation would have a detrimental effect on property values in the area.

The County submitted that from a land use perspective, the area of application falls within the County's Woodbend-Graminia Structure Plan area with country residential acreages being the primary form of developments. The County opposed the drilling of the well because it felt the well's presence would effectively sterilize a portion of a municipal reserve located to the west of the proposed well site (see Attachment 1). In addition, the County opposed the drilling of the well since it was the County's belief that the well would impose various hardships on the local residents from the point of view of safety and aesthetics.

## 2 ISSUES

The Board, when considering such an application, must weigh the evidence as submitted by the opposing parties in arriving at its decision. Firstly, the purpose of the well must be established. Balanced consideration must be given to the rights of the mineral owners and the rights of the surface owners, with the rights of the mineral owner to develop the resources being contingent upon compliance with the Oil and Gas Conservation Act (the Act) and other legislation. Conservation of the resource must be considered to ensure a timely development of the resource and benefits to both the private and public sectors of the Province. The technical feasibility and economic viability of the well must also be weighed when considering the purpose of the well.

The safety aspects of the applied-for well must be considered by the Board, including matters relating to public safety during the development and production phases of a project. These matters entail such safety aspects as the possibility of $H_2S$ emissions, probability of risks, evaluation of hazards, public access, and transportation of the product.

The Board must also consider the potential impacts of the applied-for well on existing developments. This includes consideration of the various setback distances established by ERCB regulations and those established by municipal and provincial authorities.

In summary, the potential economic, environmental, and social impacts of the applied-for well must be considered and weighed against the need to recover the resource and the mitigative measures which may be available to reduce those impacts.

With these factors in mind, the Board reviewed the evidence submitted at the hearing and prior to weighing that evidence in detail, sought to identify the main issues that had been raised. Obviously, the health and safety concern of the local residents, and their perceptions of the impact the well would have on their lives, occupied a large part of the hearing and was, indeed, the reason the hearing was held. However, if the applicant could not justify the purpose of its well, then the main issues of concern to the residents and County would not arise. Accordingly, the Board decided to test the purpose of the well first and, if the reasons for drilling and intended purpose were found adequate, then to proceed and consider the important matters raised by the interveners.

The issues to be tested are, therefore,

- the purpose of the well,

- the safety of the public,

- the impacts of the well, and

- the proximity to the municipal reserve.

## 3 PURPOSE OF THE WELL

### 3.1 Views of the Applicant

High Level submitted that, by virtue of entering into a private agreement with another energy company which held a 100-per-cent interest in an Alberta Crown lease, it has the right to explore for and develop the reserves which it believes underlie the southeast quarter of section 13, township 51, range 26, west of the 4th meridian. The proposed well would extend the limits of the Leduc-Woodbend J Pool, with the well being located geologically so as to encounter approximately 6.1 m to 7.6 m of oil pay. High Level estimated that if its geologic interpretation proved correct, it might encounter 56 000 cubic metres or more of recoverable oil. High Level submitted that it was aware of the sensitive nature of drilling a well in the area of application and that, as urbanization increases in the future, increased pressure on drilling activities could result in a loss of the resources and consequently the loss of this benefit to the people and Province of Alberta. It therefore submitted that it was prudent that this resource be developed at this time. In addition, considering oil prices and costs of drilling, High Level was of the belief that the project was economically viable.

### 3.2 Views of the Interveners

The residents submitted that in the face of current economic times, the well's economic viability was in question. Bearing this in mind, they also questioned the well's benefit to the people of Alberta and submitted that any benefit gained would be an infinitesimal increase as compared to overriding the rights of the citizens living in the area. Moreover, they questioned what right the applicant had to propose a well which in their view would impinge on their rights as surface owners. They further submitted that a restrictive covenant for the Silver Bell subdivision precluded such a proposal, and that the covenant had been created to ensure that the standard and quality of life which they currently enjoyed was maintained.

### 3.3 Views of the Board

The Board accepts High Level's submission that, by virtue of its completion of an agreement with another company respecting the petroleum and natural gas lease and thereby obtaining title to the minerals, High Level has a right to any petroleum and natural gas it may find down to and including the base of the Mannville Formation in the southeast quarter of section 13. Therefore, subject to the rights of others, High Level has a right to explore for hydrocarbons which may underlie the subject lands.

Because no factual evidence was submitted to suggest the contrary, the Board accepts High Level's position with respect to the well's economic viability, its need in order to drain reserves, and its wish to proceed with the drilling of the well. While the Board believes that a mineral lease conveys a right to recover a resource, that right is contingent upon compliance with the Act. Therefore, consistent with the purposes of the Act, the purpose of the well must be weighed against any adverse safety, social, and environmental impacts of drilling and producing. The Board considers the latter in the following sections of this report. The Board must also consider whether or not there is an urgency respecting the recovery of the resources prior to any further residential development in the area which could either increase the adverse impacts of the well or preclude the drilling altogether.

The Board is satisfied that a purpose for the well has been established and accordingly will consider the matters raised by the interveners, including their rights as co-existent surface owners.

## 4 SAFETY OF THE PUBLIC

### 4.1 Views of the Applicant

Regarding the concerns expressed by the interveners for their safety, due to the potential of encountering and the possibility of a release of $H_2S$, High Level stated that it was prepared to implement measures which it believed to be extremely conservative. The applicant anticipated encountering very low levels of $H_2S$, up to a possible maximum of 1.64 per cent. The applicant further anticipated that, based on available geologic information from the surrounding area, the reservoir would be underpressured, thereby being incapable of releasing any hydrocarbon to the surface under its own natural drive. Notwithstanding this, High Level submitted that it believed that its proposed safety measures were prudent, given the concerns raised by local residents and the proximity to the city of Edmonton, and recognizing the sensitivity of drilling and producing a well in a developed area.

High Level had performed a statistical risk analysis which anticipated that the risk to the local residents being exposed to $H_2S$ was in the order of 0.04 chances per million, based on a worst-case scenario. To test the potential of a sour gas release, the applicant, using the maximum $H_2S$ content of 1.64 per cent, had calculated a release rate of 0.0098 cubic metres per second for the subject well, resulting in a planning radius of 137 m, which, in High Level's opinion, represented a worst-case scenario. Notwithstanding this, High Level proposed a larger emergency response planning zone of 500 m to ensure that all contingencies and concerns were addressed and had determined that five families reside within that 500-m radius. Furthermore, studies of $H_2S$ concentrations based on this release rate undertaken over the 500-m radius indicated that, in the unlikely event of a release of $H_2S$, dispersion would occur very quickly.

High Level was also prepared to adopt what it felt were extraordinary measures to ensure safety while drilling, such as additional drilling supervisory personnel, regular blowout prevention drills, the use of $H_2S$ monitoring equipment, and fencing of the lease area, as listed in Attachment 3.

High Level acknowledged that, during the production phase, a problem could arise from a mechanical failure of equipment, but submitted that since the reservoir was anticipated to be underpressured and incapable of flowing without a pump operating, this possibly could be guarded against through such measures as the installation of emergency shut-down devices. Access to any production facilities would be restricted by a fence and a locked gate.

High Level stated it was confident that it had the level of expertise required to maintain high safety standards and that, if needed, it could hire additional personnel with $H_2S$ experience to ensure that the well proceeded safely.

### 4.2 Views of the Interveners

The residents' primary concern with respect to safety resulted from the potential of the proposed well to encounter $H_2S$ during the drilling of the well and over its productive life. The residents believed that, if an $H_2S$ emission occurred, it would be quickly transmitted over the surrounding area and be in such concentrations as to be very detrimental to their health, and in fact, would endanger their lives.

They were also of the opinion that no amount of risk was acceptable if the safety of the public would be endangered as compared to any possible benefit resulting from the proposed well.

The residents were also concerned about the possibility of access by the public, particularly children, to the well site during both drilling and production phases and submitted that, if the well were to proceed, the area should be fenced during all phases of operation.

Should a mishap occur, the residents were not satisfied that the planning zone as prepared by the applicant would be sufficient to ensure the safety of all local residents. As the zone did not include those persons residing just beyond 500 m from the well but still within the residential development, they submitted that the planning radius may be insufficient to deal with an emergency.

The County supported the position of the local residents with respect to the hazards of $H_2S$.

### 4.3 Views of the Board

Due to the geologic nature of the Basal Quartz in the area of application, and the expectation that this would be an oil well in an underpressured reservoir with some associated gas, the Board is of the view that the risk of and from an actual blowout while drilling the well would be extremely low. The Board notes the extra precautionary measures proposed by High Level and believes that these measures would further reduce the possibility of a mishap occurring. Even though the Board believes that the risks associated with a blowout do not preclude the well being drilled and tested, given the population in the area a formal Emergency Response Plan would be required of the applicant if the well is approved. The plan would have to be discussed with residents of the area prior to being approved by the Board. The Board would point out that the requirement for an Emergency Response Plan in this case is ultra-conservative and does not imply a level of risk, and believes there is virtually no probability of a real need to evacuate area residents.

Although the Board makes no comment on the quantitative aspects of the the risk analysis submitted by the applicant, it has reviewed the evidence carefully and concurs that the risk of exposure to $H_2S$ would be very low.

The Board is of the opinion that, given the nature of the reservoir, the most likely situation for a possible release of $H_2S$ would be during the production stage of the well and would be due to a mechanical failure. However, the risk of such an event is not high and local residents would not be endangered because only small amounts of $H_2S$ could be released, because the production facilities would have to be equipped with emergency shut-down devices, and because any production facilities would be required to be a closed system.

The Board tends to be very conservative in a safety-conscious sense where there is a possibility of even a small sour gas release. As a result applicants could be led, as might have happened in this case, to implement measures which may alarm local persons and imply a greater risk than is actually present. In this case the applicant prepared a Draft Alert Plan. Assuming the worst possible scenario, a planning zone of 137 m was established for the well through standard calculations. This plan was then expanded to 500 m by the applicant, which the Board believes was prudent given the location of the well, but not strictly necessary given the small estimated potential for release of $H_2S$. The expansion alarmed the local residents, and did not reflect the true nature of the reservoir expected to be encountered.

If it approves the application, the Board would restrict public access to the site during drilling and production phases by requiring adequate fencing to ensure a secure site.

With respect to High Level's expertise in drilling the proposed well, the Board notes that experienced persons are available to the applicant and that it is common practice in industry to acquire additional personnel to deal with any area of expertise which may be required for a particular project. Accordingly, if the application was approved, the Board would expect High Level to hire such people if they were not already on staff and, although High Level would have full responsibility for safe operations, the Board would have ERCB field staff available to check drilling operations and equipment, production installations, and personnel involved in all phases to ensure that all safety precautions are implemented and adhered to.

# 5 IMPACTS OF THE WELL

## 5.1 Views of the Applicant

High Level submitted that the proposed well location was determined based on geologic information which indicates a Basal Quartz anomaly in the southeast quarter of section 13. The applicant interpreted this anomaly to be a structural high on a fluvial channel sand. Based on this interpretation, High Level submitted that the drilling location was site specific. Given this, High Level believed the well site could not be moved and accordingly, it was willing to implement measures to mitigate any adverse impacts the well could cause on local residents. High Level had investigated the possibility of directionally drilling the well, but was reluctant to consider this as a viable alternative because of the additional expense and operational problems which could result. Further, it was High Level's opinion that movement of the wellhead would only result in shifting the concerns and impacts identified by the residents to another area. High Level submitted that the adverse impacts of the well could actually be increased by directional drilling because additional drilling time would be required, and problems which were not common to a conventionally drilled well could arise in the future with production and servicing operations.

High Level acknowledged the impacts identified by the interveners and indicated that it was prepared to attempt to reduce these to the lowest possible level. Mufflers would be installed on engines to reduce noise levels. Additional trees could be planted around the lease to reduce the visual impact. Odours could be contained by using closed vapour recovery systems during the testing and production phases of the well. The residents' water wells would be tested before and after drilling to ensure no damage to the acquifer had occurred. Water for drilling operations would be trucked to the site to ensure no draw-down effect on the water table. Traffic would be limited to daylight hours. In addition to these measures, High Level stated that it would produce and operate the well in accordance with the conditions as set out on page 46 of the Board's West Edmonton Inquiry Report, with the exception that it requested exemption from conditions C and G for a period of 90 days, in which time the well could be production tested and a production scenario established. These conditions are listed on Attachment 2.

High Level also submitted that the Board had no jurisdiction over matters respecting the restrictive covenant in the Silver Bell subdivision, because such matters raised questions of law relating to the land surface and to the private, legal, or contractual rights among the parties. Accordingly, it submitted that the legal effect of the restrictive covenant was not a matter the Board could address.

## 5.2 Views of the Interveners

The residents opposed the drilling of the well and could suggest no alternative location for the well or related facilities which would alleviate the adverse impacts that they perceived would be imposed on them if the application were approved. Noise, odours, damage to water wells, visual impacts, and increased traffic were concerns which the residents believed would affect the quality of life they currently enjoy in the area. They did not feel that the mitigative measures proposed by High Level could ensure that these impacts would not arise or that they would be adequately alleviated. This was based in part on past experiences with the activities of oil companies in the area. The interveners submitted that their wish to maintain their life-style was exemplified by the restrictive covenant on their land, which had been voluntarily entered into to maintain their desired standard of living.

The County supported the position of the residents respecting these impacts. The County also submitted that, if the well were approved, it endorsed directional drilling, although it did not suggest a specific well location. It further submitted that development of oil and gas wells was not a permitted or discretionary use within a county residential subdivision in the County of Parkland's land use by-law and accordingly requested that, notwithstanding the exemption of such wells in the Planning Act, the Board recognize the County's land use by-law and deny the application.

### 5.3 Views of the Board

The Board notes that High Level's geologic interpretation was not disputed and that no specific alternative location was suggested for the well to alleviate the perceived adverse impacts. Directional drilling of the well on an adjacent lot or from the land of Dr. Wianko could create technical problems and would not appear to be acceptable in alleviating the concerns expressed.

The Board has reviewed the potential adverse effects which could result from the proposed well, and notes the mitigative measures as proposed by High Level. Noise would be reduced through the use of mufflers and drilling operations would occur over a relatively short period. The chance of odours would be reduced by the use of a closed system during the testing and production phases. The Board notes High Level's undertaking to test water wells in the area both before and after drilling. The visual impact of any installation could be reduced by the proper planting of trees if the existing tree cover is insufficient for that purpose. The Board would further expect High Level to attempt to keep traffic to a minimum and at reasonable hours.

Given these measures, the Board believes the well could be drilled and tested without seriously disrupting the life-style of nearby residents. Depending on the test results, the well may or may not be produced. The applicant indicated that the well would be produced through a closed system to an already existing battery remote from the residential development. In any case, the proposed production operations would be subject to future applications and reviews by the Board.

The Board has carefully considered the submissions with respect to the restrictive covenant in the Silver Bell subdivision and the County of Parkland's land use by-law. In doing so, the Board has noted that no party formally requested the Board to make specific rulings on these matters. The Board understands that the local residents and the County requested the Board to consider these matters as indications of their desire to develop a rural residential community in the area. Indeed, the Board is of the view that it has no jurisdiction to make specific rulings respecting the legal effect of the restrictive covenant or of the County's land use by-law, because it believes that the restrictive covenant raises questions of law respecting its interpretation and applicability which are beyond the Board's jurisdiction. Also, it believes that the Planning Act and land use by-laws made thereunder do not apply to a well as defined in the Act.

However, the Board does believe that the rights of both the surface owners and the mineral owners must be respected as much as possible and that concurrent development of both the surface and the minerals can occur if special measures are implemented. In this regard, the Board has carefully considered the special requirements set out in the West Edmonton Inquiry Report, and has concluded that such concurrent development can occur in the subject area of application if the special measures are required of the applicant. Even though these requirements were designed for use in an urban residential environment, the Board believes they are reasonable in this case and not too onerous on the applicant.

Respecting High Level's request for exemption from conditions C and G as set out in Attachment 2, the Board believes that such an exemption is unnecessary as both conditions recognize the special conditions which may be associated with testing a well. It would therefore be appropriate, and consistent with ERCB Inquiry Report D 83-F, to allow a temporary incinerator type flare stack and to approve the trucking of produced fluids during a test period not exceeding 90 days while the well was production tested and a production scenario established. However, even for the production test period, the Board would require a completely closed production system, including vapour gathering for all storage tanks and the installation of an incinerator type flare stack that would produce no visible flare or smoke. Furthermore, High Level would be required to have a Board field inspector present during the initial test period.

The Board notes that, as a result of the delay in the processing of the application, there appears to be some misunderstanding regarding the commitments made at the hearing by the applicant. To clarify the matter, the Board has listed, in Attachment 3, the commitments made by the applicant. If the well proceeds, the Board would expect all of these to be adhered to.

## 6 MUNICIPAL RESERVE

### 6.1 Views of the Interveners

The County submitted that it was opposed to the drilling of the well as it would effectively sterilize a portion of a municipal reserve located to the west and adjacent to the proposed well site (Attachment 1). This would restrict the potential to develop the reserve for its intended purposes. The boundary of the reserve lies approximately 47 m from the proposed wellhead. The County submitted that this reserve should be subject to the standard 100-m setback distance from a wellhead to a surface improvement and could see no justification for the Board to relax this distance.

The local residents supported the County's contention that the reserve had special status and submitted that currently various recreational activities took place on the land such as hiking, bike riding, and general recreation.

### 6.2 Views of the Applicant

High Level submitted that it believed that the setback distances as described in the Regulations referred to actual structures or developments. As none currently existed on the reserve, High Level was of the opinion that there was no basis to enforce a setback distance of 100 m to a boundary of a parcel of land.

### 6.3 Views of the Board

The Board accepts the County's submission that the reserve is an established special land use area within the subdivision that has been set aside specifically for public purposes.

The Board therefore believes that the area, and hence the use of the reserve, should not be restricted although no structure yet exists on the land. The Board does believe, however, that as in the case of wells to be drilled within the West Edmonton Inquiry area, certain circumstances arise where the standard 100-m setback can be reduced. In particular, the ERCB Inquiry Report indicates at page 45 that the Board would be prepared to allow a separation distance of as little as 50 m provided that special practices were followed to minimize the visual, noise, and odour impacts of the applied-for well. If measures can be taken to ensure the reserve is not restricted and would experience very little impact, then the Board would be prepared to exercise its discretion and reduce the 100-m setback to a 50-m setback.

In this specific case, because the applicant is prepared to carry out all the mitigative measures previously discussed, at its own expense, the Board believes that it would be appropriate to reduce the setback distance from the wellhead to the boundary of the reserve to 50 m.

The Board notes that this requires moving the wellhead approximately 3 m to the east. The Board would point out that with this relaxation, it does not necessarily contemplate maintaining anything less than 100 m from surface improvements present or to be built in the future in other areas.

The Board therefore concludes that the County's main concerns respecting the setback distance can be alleviated and the well can proceed with a 50-m setback to the boundary of the municipal reserve.

## 7 DECISION

The Board has carefully considered the evidence, including the expressed concerns of the interveners and the responses by the applicant. It has found that the well could be drilled safely and that the applicant can and will be required to implement measures to reduce the potential adverse impacts on the area and local residents to a minimum. In addition, the Board notes that any production scenario would involve moving the production to an existing battery, but in any case, would be subject to a future application.

The Board, after consideration of arguments opposing the well, believes that there is a need for the well if any related reserves are to be recovered prior to further residential development. The Board also believes that need outweighs the negative social and economic impacts that would occur, recognizing that they would be substantially reduced by the measures High Level will be required to implement. The Board, therefore, believes that a well licence should be issued.

Accordingly, the application is approved and a well licence will be issued in due course, subject to the conditions and undertakings, and to submission of an amended survey plan showing a setback distance of at least 50 m from the wellhead to the boundaries of the municipal reserve. An acceptable Emergency Response Plan will also be required prior to the commencement of drilling operations.

DATED at Calgary, Alberta, on 20 March 1987.

ENERGY RESOURCES CONSERVATION BOARD

G J DeSorcy

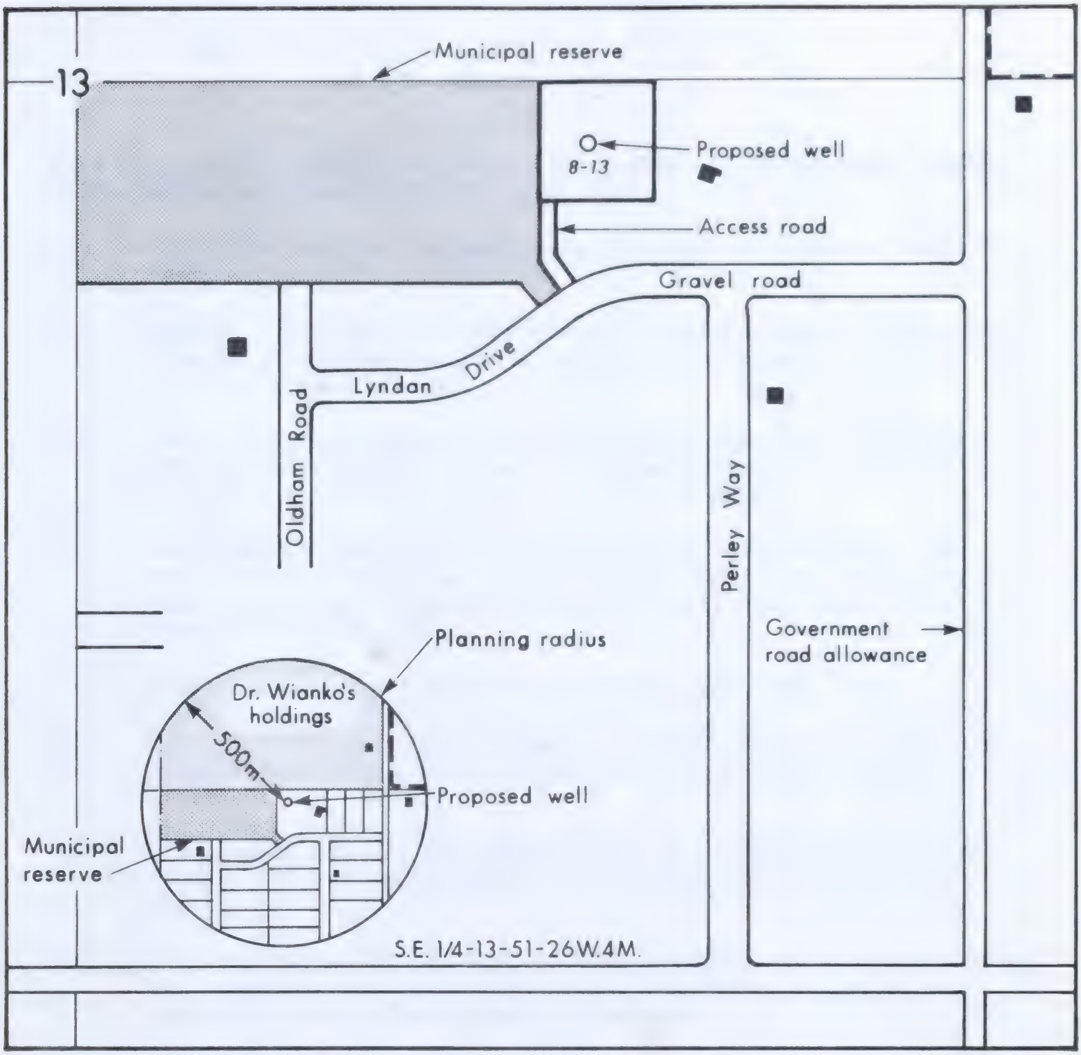
G. J. DeSorcy, P.Eng.
Chairman

C. J. Goodman

C. J. Goodman, P.Eng.
Board Member

R. G. Paterson

R. G. Paterson, P.Eng.
Acting Board Member



■ Residences within planning radius at time of hearing

— — — Edmonton city limits

ATTACHMENT 1 HIGH LEVEL ET AL LEDUC 8-13-51-26W.4M. PROPOSED WELL

Application No. 860692

# ATTACHMENT 2

Excerpt from ERCB Inquiry Report D 83-F: RESOURCE DEVELOPMENT/URBAN DEVELOPMENT: WEST EDMONTON AREA, page 46.

(a) All wells would be equipped with high and low pressure shut-down devices.

(b) Pumping wells would be equipped with electric-drive motors and a blowout prevention device to shut off flow from the well in the event of a rod failure.

(c) Lease equipment would be limited to that absolutely essential for the operation of the well. In particular, no permanent flaring facilities installed at the well site.

(d) Wells must be properly fenced, including a locked gate. In addition to restricting unauthorized access to the site, the fence should be designed such that it will reduce the visual impact of the facility.

(e) Good housekeeping practices and regular painting a must.

(f) A sign giving the company name and 24-hour telephone numbers to contact must be placed in a prominent place at each well location.

(g) Trucking of oil and salt water would be prohibited except in special circumstances and only with prior approval from the Board.

(h) Electrification of the well equipment must be in accordance with the neighbourhood electrical system, including underground wiring if such is being used in the area.

# ATTACHMENT 3

## Commitments and Undertakings Made by High Level at the Public Hearing

### 1. Drilling Phase

- Emergency Response Planning
    - will hold further public meetings with area residents to discuss emergency response plan if there is significant interest
    - if potential well control problem should occur during drilling, immediately notify persons within the emergency planning zone
    - work in conjunction with the appropriate authorities if a release of $H_2S$ to atmosphere occurs during drilling
- fence lease area during drilling
- truck water for use at rig
- special mufflers on the diesel engine of the rig
- contact ERCB 48 hours prior to entering the potential $H_2S$ zone
- utilize two drilling supervisors with Level 2 blowout prevention certification
- one blowout prevention drill per day per crew
- maintain on-site $H_2S$ and mud tank monitoring
- perform gas entrainment monitoring
- monitor fluids for sulphides
- maintain a surface volume of mud of 150 per cent of total down hole volume
- maintain on-site safety personnel and equipment
- maintain on-site $H_2S$ monitoring truck
- drill stem testing will be closed chamber

## 2. Production Phase

- pumpjack to be powered by electricity
- use incinerator type flare stack for any production test
- use a closed vapour recovery system for any production test
- adhere to the conditions of the Board's inquiry report with special provisions on conditions C and G restricted to a test period not to exceed 90 days (see Attachment 2)
- minimize lease area to be used for permanent production
- plant trees around lease area to minimize visual impact

## 3. General Commitments

- test water wells of area residents in proximity to the well before and after drilling, upon request
- if an area resident's water well is damaged by High Level's drilling operations, High Level will drill a new water well and supply the resident with water in the interim
- re-evaluate the emergency response plan after drilling to ensure that the plan matches the actual $H_2S$ release rate from the producing zone

# ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

## APPLICATION FOR GAS REMOVAL PERMIT PSR GAS VENTURES INC.

**Decision D 86-19**
**Application 860997**

### 1 APPLICATION

PSR Gas Ventures Inc. (PSR) applied to the Energy Resources Conservation Board (the Board), pursuant to section 2 of the Gas Resources Preservation Act (the Act), as amended 31 October 1986, for a permit authorizing the removal of natural gas from the Province of Alberta. PSR requested a permit which would provide for

- the removal of 1500 million cubic metres of gas in total,
- the maximum daily removal of 423 thousand cubic metres of gas, and
- a permit term of 15 years extending to 1 November 2001.

PSR requested the permit for the purpose of supplying gas to Union Gas Limited (Union), a franchised gas distributor in the Province of Ontario.

The gas would be transported to Empress, Alberta, by NOVA, AN ALBERTA CORPORATION, and from Empress by TransCanada PipeLines Limited to the interconnection with Union in Ontario.

### 2 HEARING

On 4 November 1986 the Board convened a public hearing of the application at its offices in Calgary, Alberta, with G. J. DeSorcy, P.Eng., L. A. Bellows, P.Eng., and V. E. Bohme, P.Eng., sitting.

Of the four interventions received by the Board, only the Independent Petroleum Association of Canada (IPAC) and Northridge Petroleum Marketing, Inc. (Northridge) presented evidence. Western Gas Marketing Limited (WGML) cross-examined the applicant and advanced argument. Pan-Alberta Gas Ltd.'s participation was limited to registration only. The Board also received submissions from four interested parties, all supporting the application, but none of these parties participated in the hearing.

The following table lists those who participated in the hearing or filed submissions.

**THOSE WHO APPEARED AT THE HEARING OR FILED SUBMISSIONS**

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| PSR Gas Ventures Inc. (PSR)<br>D. G. Hart, Q.C. | J. E. Horler<br>D. C. Lee, P.Eng.<br>D. J. Haughey |
| Independent Petroleum Association of Canada (IPAC)<br>A. S. Hollingworth<br>J. A. Snider | R. B. Hillary<br>A. P. Markin, P.Eng. |
| Northridge Petroleum Marketing, Inc. (Northridge)<br>A. S. Hollingworth<br>J. A. Snider | R. D. Hall, P.Eng.<br>D. W. Minion, P.Eng. |
| Western Gas Marketing Ltd. (WGML)<br>E.W.H. Mallabone<br>G. W. Toews | |
| Pan-Alberta Gas Ltd.<br>G. H. Giesbrecht | |
| Aberford Resources Ltd. | |
| Wintershall Oil of Canada Limited | |
| Precambrian Shield Resources Limited | |
| Canada Northwest Energy Limited | |

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**THOSE WHO APPEARED AT THE HEARING OR FILED SUBMISSIONS**

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Energy Resources Conservation Board staff<br>C.J.C. Page<br>W. J. Schnitzler, P.Eng.<br>K. M. Johnston<br>G. A. Habib<br>G. J. Schroter | |

## 3 ISSUES

Section 8 of the Act provides that the Board shall not grant a permit for removal of gas from the Province unless "...it is in the public interest of Alberta to do so having regard to

(a) the present and future needs of persons in Alberta,

(b) the established reserves and the trends in growth and discovery of reserves of gas or propane in Alberta, and

(c) any other matters considered relevant by the Board."

The Board has concluded that the following questions are relevant in its consideration of the subject application:

- whether the applicant owns or has made arrangements to purchase or acquire sufficient reserves to meet the obligations of the requested permit,
- whether the gas is surplus to Alberta's requirements and permit commitments,
- whether a fair and equitable price would be obtained for the gas,
- whether the transaction, to the extent that it involves an affiliated producer and distributor, would have a negative impact on the Alberta producing industry and thus be contrary to the public interest, and
- whether a 15-year permit term is justified.

## 4 RESERVES UNDER CONTRACT TO PSR

### 4.1 Views of the Participants

PSR stated that the application was prepared in accordance with Informational Letter IL 85-17, which was interpreted to mean that it was not necessary to name the fields, pools, and areas that the gas would be removed from. Subsequent to the filing of objections by the interveners, PSR submitted additional information listing areas and reserves it had under control to serve the applied-for permit. PSR stated that those reserves have sufficient initial deliverability to meet the obligations of the applied-for permit. It indicated that it had accepted the reserve estimates provided by producers and had made no independent assessment of them.

PSR stated that it has contracted what it believes are sufficient reserves to satisfy its removal commitment under the requested permit and it is not the intention of PSR to over-contract reserves and reduce load factors which would generate a low netback to its contract producers. If necessary, PSR would contract for additional Alberta gas during the term of the removal permit.

WGML submitted that the Board must be satisfied that PSR has demonstrated it has contracted sufficient reserves and that those reserves are capable of fulfilling the removal obligations of the requested permit.

### 4.2 Views of the Board

The Board is satisfied that PSR has demonstrated, by naming the areas that are contracted and listing the net reserves dedicated, that it is generally capable of fulfilling the gas supply obligations of the requested permit. The Board is not requiring detailed estimates, including geological and engineering factors, because the requested volumes are relatively small.

The Board does note from the PSR evidence that beginning in 1992, an annual shortfall occurs in the ability of the supply areas named to deliver daily contract requirements of the project. Additional gas reserves which may be required to supply the volumes applied for would be the subject of a further application if the additional reserves were to be obtained from areas not named in the application and if those reserves were to form the bulk of the gas to be removed.

## 5 GAS SURPLUS TO ALBERTA'S REQUIREMENTS

### 5.1 Views of the Participants

PSR submitted that the gas to be removed under the requested permit is surplus to Alberta's requirements because

- the volume to be removed is relatively small and amounts to less than 0.1 per cent of the remaining reserves of the Province,
- not all of the existing permits to remove gas from Alberta are being fully utilized and the Board has jurisdiction to review such permits if the need arises,
- there is a very large volume of gas in Alberta which is shut in due to lack of markets, and
- the Gas Resources Preservation Act allows for diversion of gas intended for removal from the Province, to ensure an adequate supply for consumers in Alberta.

IPAC stated in its submission that it was "... concerned with the Board proceeding with this application at a time when current reserves dedicated to existing removal permits are close to the maximum amount of gas permitted to be removed from the Province given allowance for the existing surplus requirements determined by the Board to be necessary for future Alberta requirements." At the hearing, however, IPAC indicated that the Alberta and federal governments' policy statements regarding long-term protection for consumers of gas that were issued in late October 1986 had reduced its concerns in this respect.

### 5.2 Views of the Board

Regardless of whether any changes in Board policies result from the recently scheduled Alberta Gas Supply Protection Formulae Hearing, the Board does not believe that the present and future needs of persons in Alberta would be placed at risk by removal of the requested volumes of gas. The reasons for this view are essentially as stated by PSR in its application.

## 6 PRICE

### 6.1 Views of the Participants

In response to questions on the pricing arrangements in its gas purchase contracts, PSR stated that the price would be tied competitively with prevailing system gas prices in Union's market area and thus would accommodate market sensitive pricing. The field prices would be calculated on a netback basis after accounting for transportation charges.

Neither IPAC nor Northridge identified the price as an issue in this application. IPAC stated that surveillance of prices could be administered most effectively by the regulatory boards in the consuming provinces to ensure that the price paid by a distributor as a result of an affiliate transaction is the best price obtainable. Northridge stated that the main issue before the Board is not the actual price paid to the producers but whether the producers in the province had the opportunity to compete for this market on the basis of price.

### 6.2 Views of the Board

The Act as recently amended directs the Board to include in its assessment of the public interest "... any other matters considered relevant by the Board." The Board considers the price which would flow back to the province from an extra-provincial sale of gas to be a matter relevant to the Alberta public interest. It therefore believes it must be in a position to assess this aspect of a removal application before deciding the matter.

The most definitive manner in which this could be done would be to require the filing of the contract or at least the detailed pricing provisions. This would, however, result in the information being publicly available, and the Board believes that such an action would be contrary to the public interest and to efforts to foster a competitive industry. In the Board's judgement, the negative aspects of requiring the public filing of pricing details would be so substantial that it would not in normal circumstances ask for such information. Rather it will ask applicants, as it did in the case of PSR, to provide as much information as possible respecting the principles on which the pricing arrangements are based.

The type of information the Board has in mind would include an indication of the basis for the initial price (eg. competitive with gas or a particular competing fuel in the market place), the timing and conditions of price renegotiations, and the charges that would be made to the market price to move the gas from Alberta to the market place. The Board will then evaluate those principles and draw its conclusions as to whether they appear to be such that the sale of the gas would be in the public interest.

With respect to the PSR application currently before it, the Board is satisfied that the principles upon which the price would be determined are such that the price would be generally consistent with the public interest, in that it would be competitive with prevailing prices and would be responsive to changing market conditions.

## 7 PURCHASES BY DISTRIBUTORS FROM AFFILIATES

### 7.1 Views of the Participants

The view of IPAC on this issue is essentially the same as it expressed at the hearing of the Societe quebecoise d'initiatives petrolieres application (ERCB Decision D 86-1). With regard to this subject application, IPAC and Northridge advocated a denial until their concerns regarding affiliate transactions have been addressed by the Board.

IPAC stated that the monopolistic position of gas distributors which have corporate ties with producing entities can result in unfair marketing discrimination since distributors can offer more favourable contracts to affiliated producing companies than might be offered to non-affiliates. IPAC conceded that while the subject application may not cause a significant problem, the cumulative effect of a series of such small transactions, over a period of time, could significantly threaten the freedom of access to market opportunities. IPAC speculated that affiliate arrangements will first occur in the incremental market as gas demand increases over time, and then will expand through the replacement market as existing, "traditional" contracts expire. IPAC noted that many of those contracts with significant volumes are expected to expire by the early 1990s. IPAC stated the belief that, in the absence of any guidelines that would restrict affiliate arrangements between producing companies and distributors, the negative impact on the Alberta producing industry could be very significant.

IPAC urged the Board to adopt some form of restriction for affiliated producer-distributor transactions. As an appropriate policy, IPAC suggested the Board deny outright any new affiliated producer-distributor applications where there had been no existing contract as of 1 November 1985. However, affiliated producer-distributor contracts in existence prior to 1 November 1985 would be allowed to continue, be renegotiated and extended, provided that such volumes do not exceed their pro rata historical share of the market.

Northridge expressed similar concerns insofar as affiliated producer-distributor transactions threaten open access to markets by non-affiliated independent producers. Northridge also stated that if the practice should become too general there would be no incentive for distributors to purchase their gas supply on a competitive basis, and this would therefore frustrate the objective of the 31 October 1985 Intergovernmental Agreement on Natural Gas Pricing and Marketing (the Agreement). Northridge stated that the Board should approve only those applications where gas supplies are obtained through open tender, thus allowing all producers the opportunity to compete on the basis of price.

Neither IPAC nor Northridge expressed concerns about affiliated transactions between producers and large industrial users, as such industrial users have to operate in a competitive market place, unlike distributors who enjoy a monopolistic position. Moreover, IPAC stated that these types of arrangements would not tie up a significant share of the market.

In its closing argument, WGML suggested that the Board be satisfied that the gas to be removed would serve incremental requirements of Union, and that there should be assurances that Union will take its full contract demand under its existing contracts before taking any gas under this application.

In response to the concerns respecting affiliated producer-distributor transactions, PSR stated that the Agreement allows distributors to purchase gas directly from producers at mutually agreed-upon prices. PSR also noted that the Pipeline Review Panel, in its report[1], states specifically that there is no need to limit the volumes of gas that distributors may purchase from affiliates.

PSR argued that the IPAC proposal to restrict affiliate producer-distributor transactions is arbitrary and discriminatory. It is arbitrary because it chooses 1 November 1985 as a cutoff date and discriminatory because it prevents companies that made investments in the producing industry from accessing their own resource base.

## 7.2 Views of the Board

None of the interveners opposing the application specifically identified which aspects of Alberta's public interest would be adversely impacted as a result of granting PSR the applied-for removal permit. Similarly, none of the interveners identified what part of the public interest could be enhanced had the transaction been based on a non-affiliated contract. The Board does not believe that there could be significant negative impacts associated with a transaction such as that described by the applicant, given the very small volume of gas that is being requested. Thus, the Board finds no justification for denying the application on these grounds.

With respect to the IPAC request that the Board adopt guidelines that would limit affiliated producer-distributor transactions, the Board believes it would be inappropriate to implement such guidelines as a result of a limited proceeding and where there was no specific evidence demonstrating an impact on the public interest. If the industry is of the view that there is a need for a restriction on affiliated producer-distributor permit removals in order to protect the Alberta public interest, the Board believes it (the industry) should prepare and submit documentation identifying the nature and probable extent of impacts and any possible remedies. After reviewing any such documentation, the Board would decide whether a hearing would help to resolve the issue.

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[1] A Review of the Role and Operations of Interprovincial and International Pipelines in Canada Engaged in the Buying, Selling, and Transmission of Natural Gas, Pipeline Review Panel, June 1986.

## 8 TERM OF THE PERMIT

PSR requested that its permit have a term of 15 years to 1 November 2001, to synchronize the permit with the transportation and sales contracts.

For this reason, and because the permit would be for a small volume and could be reviewed if it were not properly utilized, the Board is satisfied that the requested term is reasonable.

## 9 DECISION

Having regard to the evidence presented, and to the conclusions set out in the previous section of this report, the Board is satisfied that the granting of the gas removal permit requested by PSR would be in the public interest of Alberta. The Board is therefore prepared, with the approval of the Lieutenant Governor in Council, to issue the requested permit. It would be in the form shown in Appendix A and would be subject to the terms and conditions contained therein, as well as any conditions imposed by the Lieutenant Governor in Council.

DATED at Calgary, Alberta, on 9 December 1986.

ENERGY RESOURCES CONSERVATION BOARD

GJ DeSorcy

G. J. DeSorcy, P.Eng.
Vice Chairman

LA Bellows

L. A. Bellows, P.Eng.
Board Member

VE Bohme

V. E. Bohme, P.Eng.
Board Member

FORM OF PERMIT*

## THE PROVINCE OF ALBERTA

## GAS RESOURCES PRESERVATION ACT

## ENERGY RESOURCES CONSERVATION BOARD

IN THE MATTER of a permit to
PSR Gas Ventures Inc.
authorizing the removal of gas
from the Province

## PERMIT NO. GR 86-69

WHEREAS PSR Gas Ventures Inc. has applied to the Energy Resources Conservation Board for a permit, pursuant to the Gas Resources Conservation Act, being chapter G-3.1 of the Statutes of Alberta, 1984, authorizing the removal of gas from the Province; and

WHEREAS the Board, upon inquiry into and hearing of the application, is of the opinion that the provisions of the Act affecting the application have been complied with and that the granting of the application is in the public interest having regard to those matters set forth in section 8 of the Act; and

WHEREAS the Lieutenant Governor in Council, by Order in Council numbered O.C. ______/______ and dated ________________ has authorized the granting of the permit subject to certain conditions set out on the Order in Council hereto attached.

THEREFORE, the Energy Resources Conservation Board, pursuant to the Gas Resources Preservation Act, being chapter G-3.1 of the Statutes of Alberta, 1984, hereby orders as follows:

1. The application of PSR Gas Ventures Inc. (hereinafter called "the Permittee") for removal of gas from the Province, is approved, subject to the terms and conditions herein contained.

2. Gas shall be removed from the Province pursuant to this permit in accordance with Application No. 860997 by the Permittee dated 14 August 1986.

3. This permit shall be operative for a term commencing on the date of this permit and ending 1 November 2001.

4. The quantity of gas that may be removed from the Province pursuant to this permit shall not exceed 1 500 000 000 cubic metres.

5. The Permittee shall remove or cause to be removed only such gas as is transported on behalf of the Permittee through Section 9 of Township 20, Range 1, West of the 4th Meridian, for delivery from the facilities of NOVA, AN ALBERTA CORPORATION to the pipelines of TransCanada PipeLines Limited.

6. (1) All gas removed from the Province pursuant to this permit shall be measured by or on behalf of the Permittee by meters approved by the Board.

(2) The relative density, higher heating value and volume of all gas received by the Permittee through the facilities referred to in clause 5 shall be measured and reported in a manner approved by the Board, by or on behalf of the Permittee, at or near the points at which gas is delivered by the said facilities.

7. All quantities of gas for the purpose of this permit shall be referred to a 101.325 kilopascal pressure base and a 15° Celsius temperature base.

8. The Permittee shall supply gas from the pipeline of NOVA, AN ALBERTA CORPORATION at a reasonable price to any community or consumer within the Province, or to any public utility requiring gas for such community or consumer that is willing to take delivery of gas at a point on the pipeline transmitting the gas, and that, in the opinion of the Board, can reasonably be so supplied by the Permittee.

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* This is only a form of permit. The permit, when issued, may have minor variations from that set out here.

9. If any community, consumer or public utility is willing to take delivery of gas pursuant to clause 8 and agreement on the price to be paid for the gas cannot be reached, the price to be paid shall be determined by the Public Utilities Board on the application of an interested party, and the part of the price attributable to transportation shall be based on the assumption that the gas has been supplied from the capable source or sources available to the Permittee nearest to the point of delivery.

10. (1) Attached hereto as Appendix A to this permit is the order of the Lieutenant Governor in Council authorizing the granting of this permit.

(2) This permit is subject to the terms and conditions prescribed by the order of the Lieutenant Governor in Council set out in Appendix A.

MADE at the City of Calgary, in the Province of Alberta, this

ENERGY RESOURCES CONSERVATION BOARD

N. A. Strom
Board Member

# ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

# WESTBURNE PETROLEUM & MINERALS LTD. COMPULSORY POOLING LONG COULEE FIELD

**Decision D 86-20**
**Application 860988**

## 1 INTRODUCTION

### 1.1 Application

Westburne Petroleum & Minerals Ltd. (Westburne) applied, pursuant to sections 72 and 73 of the Oil and Gas Conservation Act, for an order designating that all tracts within the drilling spacing unit comprising section 12 of township 16, range 22, west of the 4th meridian (section 12), be operated as a unit to permit the production of gas from the Glauconitic sandstone of the Long Coulee Mannville V Pool (V Pool). The applicant proposed that production occur through PanCanadian Petroleum Limited's (PanCanadian) well, PCP ET AL LONGCO 10-12-16-22 (10-12 well), and that Westburne be appointed operator of the well.

Westburne holds the mineral rights to the Glauconitic sandstone in the southwest quarter (SW 1/4) of section 12 (Tract 1), and PanCanadian holds the rights in the north half (N 1/2) and southeast quarter (SE 1/4) of section 12 (Tract 2). Westburne proposed that the allocation of costs and revenues be based on the area of the V Pool underlying each tract, namely 10 per cent for Tract 1 and 90 per cent for Tract 2.

Westburne stated that it planned to pay its share of the drilling and completion costs forthwith, and therefore recognized no need for the Board to impose a penalty against those costs. Westburne added that if the Board chose to apply the penalty, the applicant should be given 30 or 60 days in which to pay those costs without incurring the penalty.

### 1.2 Intervention

PanCanadian, as lessee of the mineral rights to the Glauconitic sandstone in the N 1/2 and SE 1/4 of section 12 and operator of the 10-12 well, intervened to oppose the application.

### 1.3 Hearing

The application was heard on 29 October 1986 at a public hearing held in Calgary, Alberta, before a Board panel comprising L. A. Bellows, P.Eng., J. R. Pow, P.Eng., and G. A. Warne, P.Eng.

## THOSE WHO APPEARED AT THE HEARING

| Principals and Representatives (Abbreviations Used in Report) | Witnesses |
|---|---|
| Westburne Petroleum & Minerals Ltd. (Westburne)<br>J. R. Smith | K. J. Bohlken, P.Geol.<br>S. D. Irish<br>J. Koning, P.Geol. |
| PanCanadian Petroleum Limited (PanCanadian)<br>P. R. Murray | A. Arness<br>G. Chen, P.Eng.<br>P. J. Cummings, P.Geol.<br>J. K. Thompson |
| Energy Resources Conservation Board staff<br>H. R. Hansford<br>V. J. Vogt<br>E. M. Shima, P.Geol.<br>L. W. Elsner, P.Geol. | |

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## 2 DECISION

The geological evidence respecting the V Pool at section 12 is too uncertain to form a basis for allocating costs and revenues to the SW 1/4 of section 12, held by Westburne, and the remainder of the section, held by PanCanadian. Moreover, agreement by all parties that the majority of the SW 1/4 of section 12 is not underlain by the V Pool precludes the allocation of costs and revenues in direct proportion to the total areas of the tracts. Having regard to these circumstances and to the position of the two wells in their respective tracts in section 12, the Board has decided that the undisputed net gas pay thicknesses at these wells should form the basis for the tract allocations. Since, on this basis, there would be no allocation to the Westburne tract, the Board denies the application.

## 3 ISSUES

While several issues were investigated with respect to the application, the Board has concluded that the allocation of costs and revenues is the only issue that warranted consideration in reaching its decision to deny the application; therefore, the remaining issues are not addressed in this report.

## 4 CONSIDERATION OF THE APPLICATION

### 4.1 Westburne's Position

Westburne maintained that pooling is necessary as hydrocarbon reserves underlying the SW 1/4 are being drained by production from nearby wells.

Westburne submitted net gas pay isopach maps showing Tract 1 to contain 10 per cent of the pool area in section 12. The presence of the pool in the SW 1/4 of section 12 was established by geological interpretation (see figure).

Westburne demonstrated that the V Pool in the area of section 12 occurs in a northwest-southeast trending sand bar cut by a narrow shale-filled channel identified in the well in Lsd 6-12-16-22 W4M (6-12 well). Westburne interpreted the existence of a continuous sand bar between the wells in Lsd 7-6-16-21 W4M (7-6 well) and Lsd 9-14-16-22 W4M. It positioned the western edge of the sand development parallel to a straight line connecting these wells. It stated that Glauconitic channels run in a linear direction with insignificant deviations from the linear trend, and indicated that the linear trend should be used unless there was contradictory evidence.

### 4.2 PanCanadian's Position

PanCanadian rejected Westburne's proposal on the basis that the SW 1/4 of section 12 has no Glauconitic reserves. The intervener disputed Westburne's bases for establishing the V Pool's western limit and the presence of a channel at the 6-12 well.

PanCanadian supported its position with maps (see figure) showing its interpretation of Glauconitic deposition. Its maps show three sinuous sand-filled channels and one shale-filled channel, all of fairly uniform width, cutting into areas with no porous Glauconitic sandstone development. PanCanadian indicated on its pay map and in response to cross-examination that no channel, either shale- or sand-filled, is present at the 6-12 well. Its net pay isopachs by-pass the SW 1/4 of section 12 because they were drawn to reflect PanCanadian's model of a sinuous channel of uniform width.

### 4.3 Views of the Board

The Board accepts Westburne's and PanCanadian's determinations of no pay at the 6-12 well and 3 metres of gas pay at the 10-12 well. Having regard to the position of these wells in their respective tracts, the Board believes that these undisputed wellbore pay values should form the basis for establishing the tract allocation factors under a compulsory pooling order, unless the geological evidence respecting the configuration of the V Pool is sufficiently definitive to warrant its adoption as an appropriate basis for allocation purposes.

Accordingly, the Board has conducted a detailed examination of Westburne's geological interpretation, in conjunction with PanCanadian's, to assess the applicant's reasons for positioning a part of the V Pool in the SW 1/4 of section 12.

The Board has observed similarities in Westburne's and PanCanadian's interpretations. The parties concur on most wellbore pay values in the V Pool, and they are in close agreement with respect to the position of the pool's western limits at the points identified by the Board as A and B (see figure). However, the two interpretations differ substantially in most other respects.

The Board has focussed its attention on several key characteristics of the V Pool, as depicted by Westburne's maps:

- the pool bifurcates, or divides into two branches, near its southern extremity,
- its width increases southward over its mapped area from about 1.7 kilometres to almost 4 kilometres,
- its western edge follows a linear path between Points A and B, and therefore extends into Tract 1 close to the 6-12 well, and
- it contains two elongated ridges of thick pay, one of which trends into section 12, west of the 10-12 well.

The Board has examined these elements of Westburne's interpretation to determine whether there is sufficient justification for the Board to adopt the applicant's allocation for Tracts 1 and 2.

While Westburne's concept of the pool's southward bifurcation and widening deserves careful consideration, the Board finds insufficient reason for its acceptance. The Board notes that Westburne could not identify any other nearby Glauconitic sandstone pool exhibiting the bifurcation feature. On the other hand, Pan-

Canadian's concept of a sinuous pool of uniform width resulted in plausible isopachs without the bifurcation or widening features presented by the applicant. Additionally, PanCanadian reinforced this aspect of its pool interpretation by extending its mapping to the south, where the sand body containing the V Pool is shown to continue southward as a single bar of relatively uniform width (see figure). As a result of these considerations, the Board concludes that Westburne's interpretation respecting southward bifurcation and pool widening is subject to uncertainty.

As mentioned in section 4.1, Westburne interprets that the western limit of the V Pool occupies a linear position between Points A and B, with this edge extending into Tract 1, close to the 6-12 well. Additionally, Westburne recognizes a thick ridge of gas pay, trending essentially parallel to this pool edge and extending from the 7-6 well through section 12 between the 6-12 and 10-12 wells. These aspects of Westburne's mapping indirectly form the basis for its proposed tract participation factors.

The Board views Westburne's linear pool-edge approach as inconclusive because it is too inexact to be used for determining the position of the pool relative to Tract 1 where the 6-12 well, being devoid of pay, provides no positive information respecting the extent to which the pool encroaches into the tract. Tract 1 is over 2 kilometres from Point A and a similar distance from Point B, and it would be unrealistic to conclude the existence of an unwavering linear alignment over a 4-kilometre distance.

The Board notes that the applicant, in order to accommodate its linear concept, placed the pool edge in Tract 1 some 900 metres from the 10-12 well. However, it placed the pool edge only 770 metres from the diagonally adjacent 7-6 well which has over twice the pay thickness. These facts suggest to the Board that Westburne may have placed more weight on its linear concept than is justified.

Westburne interpreted an elongated ridge of thick pay to trend into section 12, west of the 10-12 well. The Board is concerned with this interpretation for two reasons: firstly, it is dependent on the applicant's linear pool-edge concept which, as mentioned, is considered by the Board to be too inexact in the vicinity of Tract 1 to warrant acceptance; secondly, over 3 metres of isopached pay thickness is shown by Westburne's detailed map to extend between the 6-12 well, with no pay, and the 10-12 well, with 3 metres of pay. The Board believes that the wellbore pay values at these wells, and the well in Lsd 6-7-16-21 W4M, could be better accommodated if this ridge were to dissipate more quickly towards the north, or to trend eastward of the position shown by the applicant. Under either circumstance, the productive reservoir area and volume interpreted for Tract 1 would be appreciably reduced or eliminated.

In conclusion, the Board finds that the applicant's geological interpretation is not conclusive and therefore does not warrant its adoption as a basis for allocating costs and revenues between Tract 1 and the remainder of section 12. The Board, however, recognizes the wellbore pay thicknesses at the 6-12 and 10-12 wells as an appropriate basis for the allocations. On this basis, 100 per cent of the section's allocation would be assigned to PanCanadian's tract.

## 5 GENERAL SECTION

Westburne, in its application, applied to be appointed operator of PanCanadian's well, PCP ET AL LONGCO 10-12-16-22. Having regard to the disposition of the application, the Board does not find it necessary to rule on this issue. The Board, however, believes it desirable to comment that it questions its ability under section 72 of the Oil and Gas Conservation Act, given other provisions of the Act, to appoint a party the operator of a well when that party has no direct interest in the well. The Board would urge an applicant to address this issue or consider alternative solutions under the existing legislation.

DATED at Calgary, Alberta, on 15 December 1986.

ENERGY RESOURCES CONSERVATION BOARD

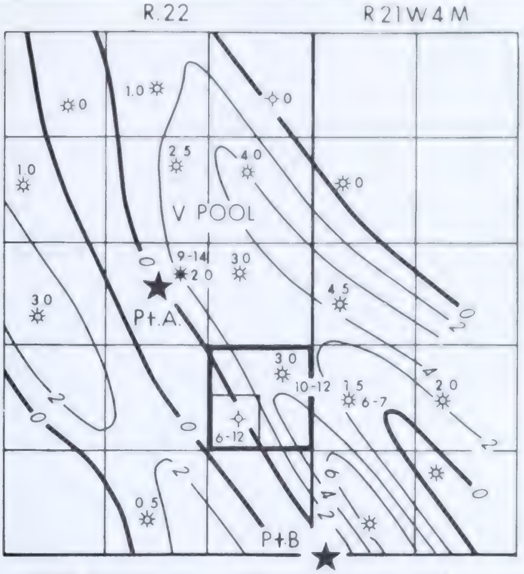
Bellows

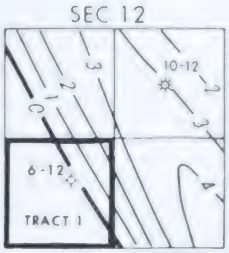
L. A. Bellows, P.Eng.
Board Member

J. R. Pow, P.Eng.
Acting Board Member

G. A. Warne

G. A. Warne, P.Eng.
Acting Board Member



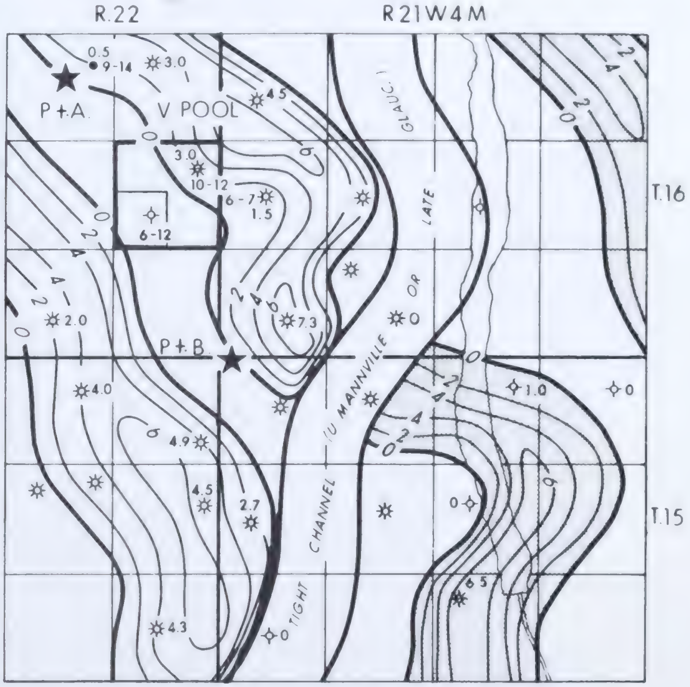


(from detailed map)

Contour Interval: 1.0metre

WESTBURNE'S GLAUCONITIC GAS PAY ISOPACH MAP (ADAPTED TO THIS FIGURE)

Contour Interval : 2.0 metres



COMPOSITE OF PANCANADIAN'S GLAUCONITIC GAS PAY AND NET POROSITY ISOPACH MAPS (ADAPTED TO THIS FIGURE)

Contour Interval : 2.0 metres

☐ Water - bearing sands

WESTBURNE'S AND PANCANADIAN'S INTERPRETATIONS RELATIVE TO SECTION 12-16-22 W4M

M.

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